THE PROPOSED HOUTHAALBOOMEN NORTH PV CLUSTER – EUPHORIA PV, NORTH WEST PROVINCE, SOUTH AFRICA

Visual Impact Assessment Report

Final V_1

DATE: 4 July 2022

Document prepared for Cape EAPrac (Pty) Ltd
On behalf of Euphorbia PV (Pty) Ltd

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LIST OF ACRONYMS

APHP	Association of Professional Heritage Practitioners
BLM	Bureau of Land Management (United States)
BPEO	Best Practicable Environmental Option
CALP	Collaborative for Advanced Landscape Planning
DEM	Digital Elevation Model
DoC	Degree of Contrast
EIA	Environnemental Impact Assessment
EMPr	*Environnemental Management Plan*

GIS	Geographic Information System
GPS	Global Positioning System
IDP	Integrated Development Plan
IEMA	Institute of Environmental Management and Assessment (United Kingdom)
KOP	Key Observation Point
LVIA	Landscape and Visual Impact Assessment
MAMSL	Metres above mean sea level
NELPAG	New England Light Pollution Advisory Group
SDF	Spatial Development Framework
SEA	Strategic Environmental Assessment
VAC	Visual Absorption Capacity
VIA	Visual Impact Assessment
VRM	Visual Resource Management
VRMA	Visual Resource Management Africa
ZVI	Zone of Visual Influence

GLOSSARY OF TECHNICAL TERMS

Technical Terms	**Definition** (Oberholzer, 2005)
Degree of Contrast	The measure in terms of the form, line, colour and texture of the existing landscape in relation to the proposed landscape modification in relation to the defined visual resource management objectives.
Visual intrusion	Issues are concerns related to the proposed development, generally phrased as questions, taking the form of "what will the impact of some activity be on some element of the visual, aesthetic or scenic environment".
Receptors	Individuals, groups or communities who would be subject to the visual influence of a particular project.
Sense of place	The unique quality or character of a place, whether natural, rural or urban.
Scenic corridor	A linear geographic area that contains scenic resources, usually, but not necessarily, defined by a route.
Viewshed	The outer boundary defining a view catchment area, usually along crests and ridgelines. Similar to a watershed. This reflects the area, or the extent thereof, where the landscape modification would probably be seen.
Visual Absorption Capacity	The potential of the landscape to conceal the proposed project.

Technical Term	**Definition** (USDI., 2004)
Key Observation Point	Receptors refer to the people located in the most critical locations, or key observation points, surrounding the landscape modification, who make consistent use of the views associated with the site where the landscape modifications are proposed. KOPs can either be a single point of view that an observer/evaluator uses to

	rate an area or panorama, or a linear view along a roadway, trail, or river corridor.
Visual Resource Management	A map based landscape and visual impact assessment method development by the Bureau of Land Management (USA).
Zone of Visual Influence	The ZVI is defined as 'the area within which a proposed development may have an influence or effect on visual amenity.'

1 DFFE SPECIALIST REPORTING REQUIREMENTS

1.1 Specialist declaration of independence

Table 1. Specialist declaration of independence.

This document was completed by Silver Solutions 887 cc trading as VRM Africa, a Visual Impact Study and Mapping organisation located in George, South Africa. VRM Africa cc was appointed as an independent professional visual impact practitioner to facilitate this VIA. I, Stephen Stead, hereby declare that VRM Africa, an independent consulting firm, has no interest or personal gains in this project whatsoever, except receiving fair payment for rendering an independent professional service.

Stephen Stead
APHP accredited VIA Specialist

1.2 Specialist report requirements in terms of Appendix 6 of the EIA Regulations (2014), as amended in 2017

Table 2: Specialist report requirements table

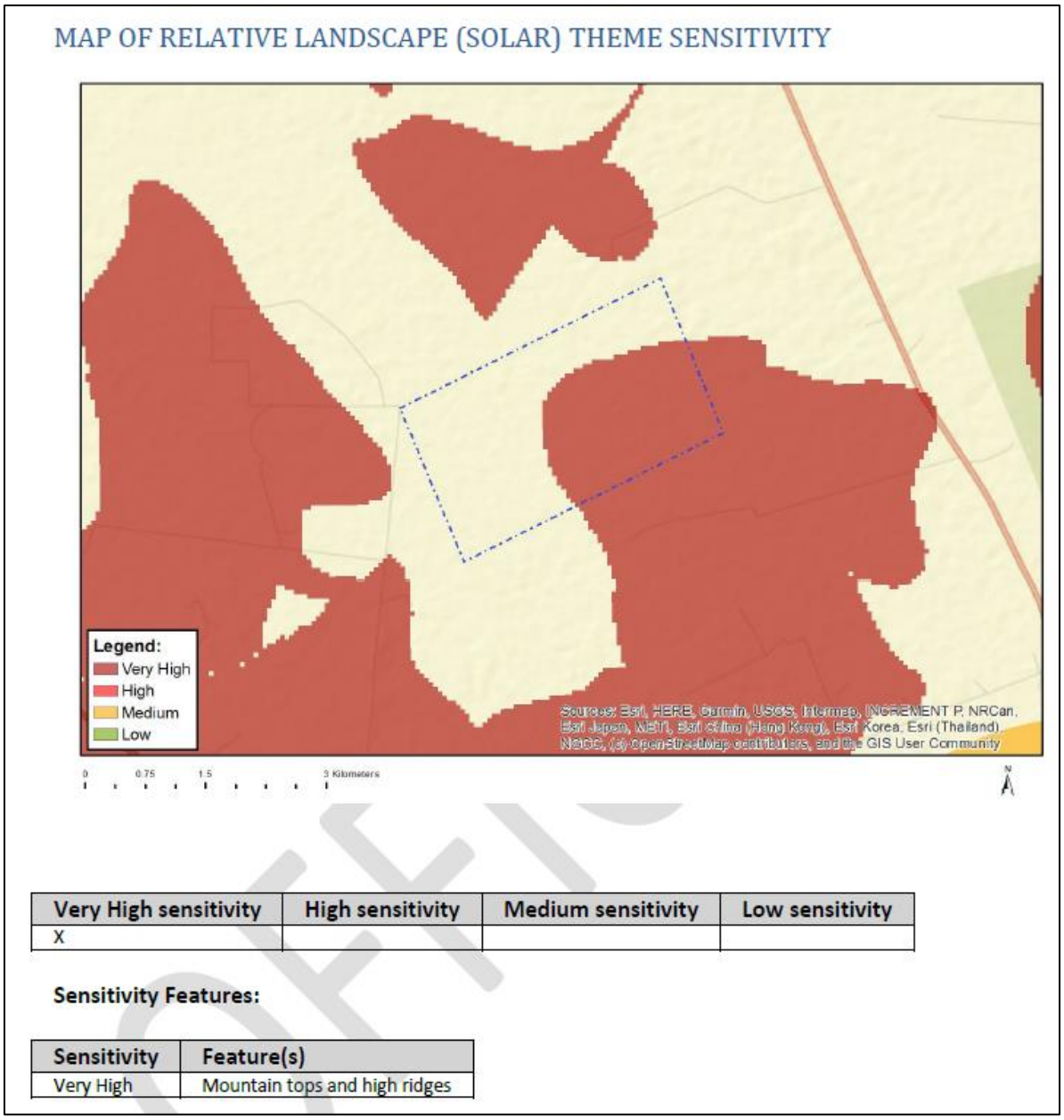
A specialist report prepared in terms of the Environmental Impact Regulations of 2014 (as amended in 2017) must contain:	**Relevant section in report**
Details of the specialist who prepared the report	Stephen Stead, owner / director of Visual Resource Management Africa. steve@vrma.co.za Cell: 0835609911
The expertise of that person to compile a specialist report including a curriculum vitae	**0** Registration with Association of Professional Heritage Practitioners

A specialist report prepared in terms of the Environmental Impact Regulations of 2014 (as amended in 2017) must contain:	**Relevant section in report**
A declaration that the person is independent in a form as may be specified by the competent authority	Table 1. Specialist declaration of independence.
An indication of the scope of, and the purpose for which, the report was prepared	**3.1** Terms of Reference
A description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change	Baseline Assessment
The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment	NA
A description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	3.5 Methodology
Details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternative;	**Error! Reference s ource not found.** Baseline Visual Inventory
An identification of any areas to be avoided, including buffers	**Error! Reference s ource not found.** Visual Resource Management Classes
A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	**Figure 18**
A description of any assumptions made and any uncertainties or gaps in knowledge;	3.3 Assumptions and Limitations
A description of the findings and potential implications of such findings on the impact of the proposed activity or activities	8 Visual Impact Assessment
Any mitigation measures for inclusion in the EMPr	9 Environmental Management Plan
Any conditions for inclusion in the environmental authorisation	NA
Any monitoring requirements for inclusion in the EMPr or environmental authorisation	NA
A reasoned opinion as to whether the proposed activity or portions thereof should be authorised	10 Opportunities and Constraints
Regarding the acceptability of the proposed activity or activities; and	11 Conclusion
If the opinion is that the proposed activity or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan	It is the recommendation that the proposed development should commence WITH MITIGATION for the key reasons motivated in the Executive Summary.
A description of any consultation process that was undertaken during the course of carrying out the study	NA
A summary and copies if any comments that were received during any consultation process	NA

A specialist report prepared in terms of the Environmental Impact Regulations of 2014 (as amended in 2017) must contain:	Relevant section in report
Any other information requested by the competent authority.	NA

1.3 DEFF Screening Tool Site Sensitivity Verification

In terms of Part A of the Assessment Protocols published in GN 320 on 20 March 2020, site sensitivity verification is required relevant to the DEFF Screening Tool. As indicated in Figure 1 below, the Map of Relative Landscape (Solar) Theme Sensitivity is rated Very High for the eastern portion of the property. The issue identified was Mountain Tops and High Ridgelines.



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
X			

Sensitivity Features:

Sensitivity	Feature(s)
Very High	Mountain tops and high ridges

Figure 1. DEFF Screening Tool for Landscape and PV.

As indicated in the photographs taken during the site visit (Annexure A), the study area is not associated with mountain top landscape features. This is a higher elevation area within

the regional landscape, but with the area predominantly flat. Vegetation on the surrounding area would reduce the visibility of the landscape change to some degree, retaining the Zone of Visual Influence on the local region. The following table outlines the relevance of the risks raised in the SSV as informed by the site visit.

Table 3. DEFF SSV PV and Landscape Risk table.

DFFE Feature	DFFE Sensitivity	Risk Verification	Motivation
Mountain Tops and High Ridgelines	*Very High*	**Low**	No mountain tops or high ridgelines were identified during the site visit.

2 EXECUTIVE SUMMARY

Visual Resource Management Africa CC (VRMA) was appointed by Cape EAPrac to undertake a ***Visual Impact Assessment*** for the proposed Euphorbia Photovoltaic (PV) Solar Energy Facility VIA on behalf of Euphorbia PV (Pty) Ltd. A site visit was undertaken on the 21st January 2022.

CONCLUSION

It is the recommendation that the proposed development should commence WITH MITIGATION for the following key reasons:

- Alignment with National planning related to energy and job creation.
- Moderated ZVI with no tourism activities or tourist view-corridors.
- Receptors sensitive to landscape change are limited but do include the adjacent farmers with High levels of Visual Exposure. While some loss of landscape resource would take place, this can be effectively contained with mitigation.

POLICY FIT **Medium to High**

In terms of the local planning, there is support of renewable energy that aligns with the project planning. There is also a focus on tourism and growth of tourist related resources. As there are no significant landscape resources being utilised for tourism within the project zone of visual influence, the ***expected visual/ landscape policy fit of the landscape change is rated Medium to High.***

METHODOLOGY **Bureau of Land Management's Visual Resource Management (VRM) method**

The methodology for determining landscape significance is based on the United States Bureau of Land Management's Visual Resource Management (VRM) method (USDI., 2004). This GIS-based method allows for increased objectivity and consistency by using standard assessment criteria to classify the landscape type into four VRM Classes, with Class I being the most valued and Class IV, the least. The Classes are derived from *Scenic Quality*, *Visual Sensitivity Levels*, and *Distance Zones*. Specifically, the methodology involved: site survey; review of legal framework; determination of Zone of

Visual Influence (ZVI); identification of Visual Issues and Visual Resources; assessment of Potential Visual Impacts; and formulation of Mitigation Measures.

ZONE OF VISUAL INFLUENCE **Medium to Low**

The visible extent, or viewshed, is “the outer boundary defining a view catchment area, usually along crests and ridgelines” (Oberholzer, 2005). In order to define the extent of the possible influence of the proposed project, a viewshed analysis was undertaken from the proposed site at a specified height above ground level. The viewshed extent is likely to be moderated across the region extending mainly to the northeast and southwest beyond the High Exposure distance area. This is due to the flat terrain with slight elevation allowing the PV panels landscape change to be contained to the local extent. For these reasons, the ZVI is rated as **Medium to Low** and is likely to be contained within the High Exposure 3km distance from the site. There will, however, be localised pockets within the 6km distance zone, where the visual impacts are Probable. Outside of this distance zone, visual impacts are possible but unlikely to take place.

RECEPTORS AND KEY OBSERVATION POINTS **25 receptor locations and 3 Key Observation Points**

Key Observation Points (KOPs) are the people (receptors) located in strategic locations surrounding the property that make consistent use of the views associated with the site where the landscape modifications are proposed. The two High Exposure KOPs are farmstead, with the R505 Road receptors have Medium levels of Visual Exposure.

SCENIC QUALITY **Low**

The scenic quality of the proposed development site is rated Low. This is due to the flat terrain that has no water features, limited vegetation and associated colours, is not a scarce visual resource and is partially degraded by agricultural practice. The only value element is the Adjacent Scenery which includes the rolling grasslands of the region that do add value. The overall sense of place is that of a rural, grassland agricultural landscape that does not offer much in terms of scenic resources.

RECEPTOR SENSITIVITY TO LANDSCAPE CHANGE **Medium**

Receptor sensitivity to landscape changes is rated **Medium**. It was found that receptor sensitivity to the current landscapes would be Moderate to Low. This is mainly due to the close proximity of the surrounding farmsteads. However, the area has limited visual resources and the strong presence of the adjacent Eskom power line does reduce the likelihood of the receptors being sensitive to landscape change on the site.

VISUAL RESOURCE MANAGEMENT ASSESSMENT

The BLM has defined four Classes that represent the relative value of the visual resources of an area and are defined making use of the VRM Matrix:

i. **Classes I and II** are the most valued
ii. **Class III** represent a moderate value

iii. **Class IV** is of least value

Class I (No-go)	• Any river / streams and associated flood lines buffers identified as significant in terms of the WULA process. • Any wetlands identified as significant in terms of the WULA process. • Any ecological areas (or plant species) identified as having a high significance. • Any heritage area identified as having a high significance.
Class II (Not recommended)	• NA
Class III (suitable with mitigation)	• Lower lying topographic areas defined as grasslands with mitigation.
Class IV (not applicable)	• As the area is zoned agricultural and located adjacent to an area that does have scenic value and could carry tourist receptors in the area region, no Class IV areas were defined.

EXPECTED IMPACT SIGNIFICANCE

Medium (-ve) *(without mitigation)*	Without mitigation, the High Exposure views from the adjacent road would detract from the local landscape character degrading local landscape resources. The area is well set back from main roads and only two farmsteads would experience High Exposed levels.
Low (-ve) *(with mitigation)*	With mitigation, and the creation of an agri-buffer along the northern and western boundaries will entrench the rural agricultural sense of place in the Medium-term.

CUMULATIVE EFFECTS

High (-ve) *(without mitigation)*	Without mitigation, there is a potential for a strong change to the rural agricultural landscape by the intervisibility of the three semi-industrial PV landscape, with potential to degrade the local rural landscape character.
Medium (-ve) *(with mitigation)*	With mitigation, a precedent would be set for suitable PV development in rural landscapes, reducing the intervisibility potential of the PV landscape change in the medium-term, and setting a positive precedent for other PV development in the region.

PRELIMINARY MITIGATIONS MEASURES

Landscape Element	Mitigation	Motivation
Protection of local rural landscape sense of place.	50m agri-buffer with tree screening.	To reduce the intensity of cumulative views of multiple projects, a 50m agri-buffer on external property boundary is recommended. Medium sized thornveld trees in this area should be retained, encouraged to grow, and planted to a density of approximately 2 trees per 100m square. The area should be fenced off to allow for a continuation of the existing low intensity animal farming. The buffer can include roads, power lines and other infrastructure. To ensure that the area does not become a wildfire risk, the veld grasses in the agri-buffer needs to be kept short by animal grazing or cut regularly by a tractor-mower (subject to fire risk management review).
PV Panel Height Restriction	5.5m	As the site and surrounds are predominantly flat with receptors having some distance buffering, the 5.5m height proposed would be acceptable. Amendments above this height restriction should be subject to a separate VIA.

3 INTRODUCTION

Visual Resource Management Africa CC (VRMA) was appointed by Cape EAPrac to undertake a ***Visual Impact Assessment*** for the proposed Euphorbia Photovoltaic (PV) Solar Energy Facility VIA on behalf of Euphorbia PV (Pty) Ltd. A site visit was undertaken on the 21st January 2022. The proposed development site is located in the Northwest Province, Ditsobotla Local Municipality and within the Ngaka Modiri Molema District Municipality (NMMDM) as mapped in Figure 2. The proposed development will be part of the Houthaalboomen North PV Cluster that will comprise of three PV projects and a grid connection routed to the nearby substation (subject to a separate environmental process). In order to ensure that cumulative visual impacts are assessed, mapping does include the other PV projects proposed on the property.

Table 4: Property Name per PV Facility within the Houthaalboomen North PV Cluster

Houthaalboomen North Cluster		
Name	***Site***	***Land Owner***
Euphorbia PV	Portion 2 of the Farm Houthaalboomen 31	Estelle Wessels

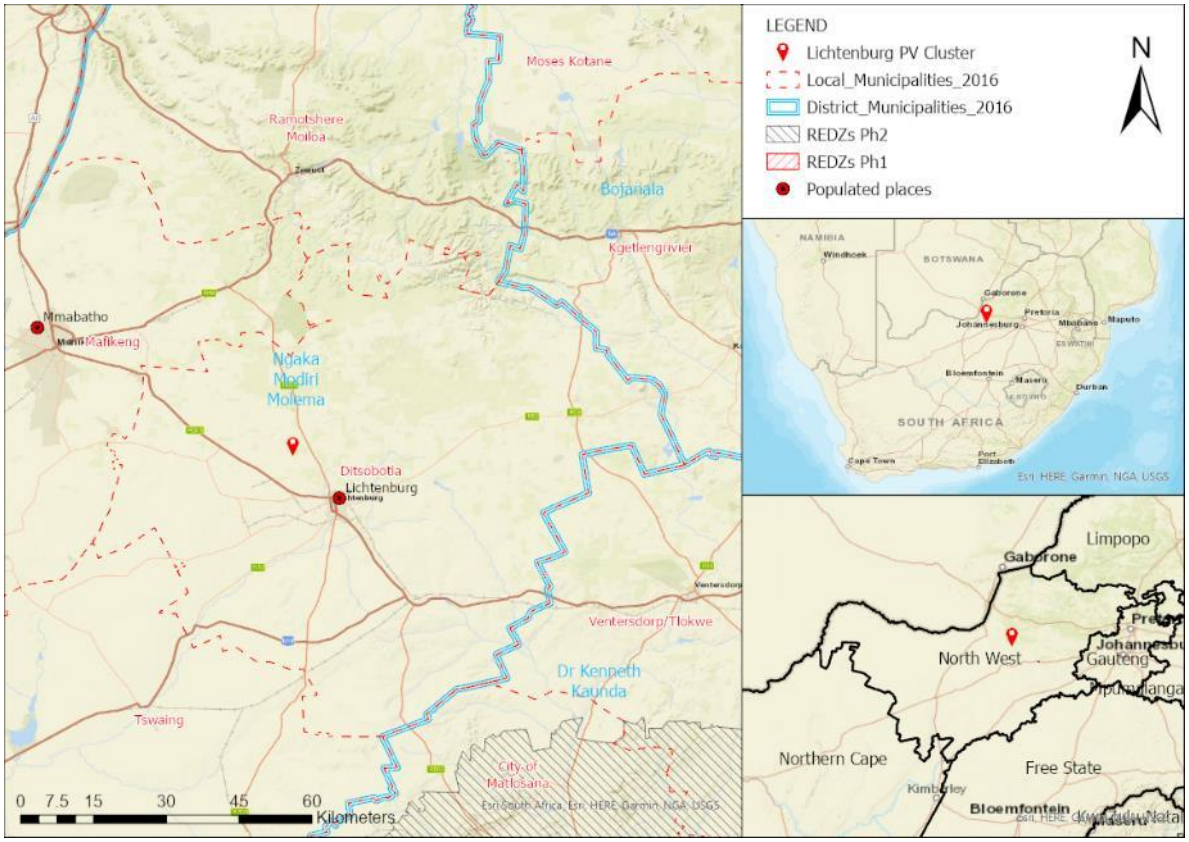


Figure 2. Project locality map within South Africa.

3.1 Terms of Reference

The scope of this study is to cover the entire proposed project area. The broad terms of reference for the study are as follows:

- Collate and analyse all available secondary data relevant to the affected proposed project area. This includes a site visit of the full site extent, as well as of areas where potential impacts may occur beyond the site boundaries.
- Specific attention is to be given to the following:
  - Quantifying and assessing existing scenic resources/visual characteristics on, and around, the proposed site.
  - Evaluation and classification of the landscape in terms of sensitivity to a changing land use.
  - Determining viewsheds, view corridors and important viewpoints in order to assess the visual impacts of the proposed project.
  - Determining visual issues, including those identified in the public participation process.
  - Reviewing the legal framework that may have implications for visual/scenic resources.
  - Assessing the significance of potential visual impacts resulting from the proposed project for the construction, operation and decommissioning phases of the proposed project.
  - Assessing the potential cumulative impacts associated with the visual impact.
  - Generate photomontages of the proposed landscape modification.

- Identifying possible mitigation measures to reduce negative visual impacts for inclusion into the proposed project design, including input into the Environmental Management Programme (EMPr).

3.2 Study Team

Contributors to this study are summarised in the table below.

Table 5: Authors and Contributors to this Report.

Aspect	Person	Organisation / Company	Qualifications
Landscape and Visual Assessment (author of this report)	Stephen Stead B.A (Hons) Human Geography, 1991 (UKZN, Pietermaritzburg)	VRMA	• Accredited with the Association of Professional Heritage Practitioner and • 16 years of experience in visual assessments including renewable energy, power lines, roads, dams across southern Africa. • Registered with the Association of Professional Heritage Practitioners since 2014.

3.3 Assumptions and Uncertainties

- Digital Elevation Models (DEM) and viewsheds were generated using ASTER elevation data (NASA, 2009). Although every effort to maintain accuracy was undertaken, as a result of the DEM being generated from satellite imagery and not being a true representation of the earth's surface, the viewshed mapping is approximate and may not represent an exact visibility incidence. Thus, specific features identified from the DEM and derive contours (such as peaks and conical hills) would need to be verified once a detailed survey of the project area took place.
- The use of open-source satellite imagery was utilised for base maps in the report.
- Some of the mapping in this document was created using Bing Maps, Open-Source Map, ArcGIS Online and Google Earth Satellite imagery.
- The project deliverables, including electronic copies of reports, maps, data, shape files and photographs are based on the author's professional knowledge, as well as available information.
- VRM Africa reserves the right to modify aspects of the project deliverables if and when new/additional information may become available from research or further work in the applicable field of practice or pertaining to this study.

3.4 Visual Assessment Approach

The full methodology used in the assessment can be found in Annexure B, with this section outlining the key elements of the assessment process. The process that VRM Africa follows when undertaking a VIA is based on the United States Bureau of Land Management's (BLM) Visual Resource Management method (USDI., 2004). This mapping and GIS-based method of assessing landscape modifications allows for increased objectivity and consistency by using standard assessment criteria.

- *"Different levels of scenic values require different levels of management. For example, management of an area with high scenic value might be focused on preserving the existing character of the landscape, and management of an area with little scenic value might allow for major modifications to the landscape. Determining how an area should be managed first requires an assessment of the area's scenic values".*
- *"Assessing scenic values and determining visual impacts can be a subjective process. Objectivity and consistency can be greatly increased by using the basic design elements of form, line, colour, and texture, which have often been used to describe and evaluate landscapes, to also describe proposed projects. Projects that repeat these design elements are usually in harmony with their surroundings; those that don't create contrast. By adjusting project designs so the elements are repeated, visual impacts can be minimized"* (USDI., 2004).

Baseline Phase Summary

The VRM process involves the systematic classification of the broad-brush landscape types within the receiving environment into one of four VRM Classes. Each VRM Class is associated with management objectives that serve to guide the degree of modification of the proposed site. The Classes are derived by means of a simple matrix with the three variables being the scenic quality, the expected receptor sensitivity to landscape change, and the distance of the proposed landscape modification from key receptor points. The Classes are not prescriptive and are utilised as a guideline to determine visual carrying capacity, where they represent the relative value of the visual resources of an area. Classes I and II are the most valued, Class III represents a moderate value; and Class IV is of least value. The VRM Classes are not prescriptive and are used as a guideline to determine the carrying capacity of a visually preferred landscape as a basis for assessing the suitability of the landscape change associated with the proposed project.

Table 6: VRM Class Matrix Table

		VISUAL SENSITIVITY LEVELS								
		High			Medium			Low		
SCENIC QUALITY	A (High)	II	II	II	II	II	II	II	II	II
	B (Medium)	II	III	III/ IV *	III	IV	IV	IV	IV	IV
	C (Low)	III	IV	IV	IV	IV	IV	IV	IV	IV
DISTANCE ZONES		Fore/middle ground	Background	Seldom seen	Fore/middle ground	Background	Seldom seen	Fore/middle ground	Background	Seldom seen

* If adjacent areas are **Class III** or lower, assign **Class III**, if higher, assign **Class IV**

The visual objectives of each of the classes are listed below:

- The Class I objective is to preserve the existing character of the landscape, the level of change to the characteristic landscape should be very low and must not attract attention. Class I is assigned when a decision is made to maintain a natural landscape.

- The Class II objective is to retain the existing character of the landscape and the level of change to the characteristic landscape should be low. The proposed development may be seen but should not attract the attention of the casual observer, and should repeat the basic elements of form, line, colour and texture found in the predominant natural features of the characteristic landscape.
- The Class III objective is to partially retain the existing character of the landscape, where the level of change to the characteristic landscape should be moderate. The proposed development may attract attention, but should not dominate the view of the casual observer, and changes should repeat the basic elements found in the predominant natural features of the characteristic landscape; and
- The Class IV objective is to provide for management activities that require major modifications of the existing character of the landscape. The level of change to the landscape can be high, and the proposed development may dominate the view and be the major focus of the viewer's (s') attention without significantly degrading the local landscape character.

Impact Phase Summary

To determine impacts, a degree of contrast exercise is undertaken. This is an assessment of the expected change to the receiving environment in terms of the form, line, colour and texture, as seen from the surrounding Key Observation Points. This determines if the proposed project meets the visual objectives defined for each of the Classes. If the expected visual contrast is strong, mitigations and recommendations are made to assist in meeting the visual objectives. To assist in the understanding of the proposed landscape modifications, visual representation, such as photomontages or photos depicting the impacted areas, can be generated. There is an ethical obligation in the visualisation process, as visualisation can be misleading if not undertaken ethically.

Assessment Approach

The following approach was used in understanding the landscape processes and informing the magnitude of the impacts of the proposed landscape modification. The table below lists a number of standardised procedures recommended as a component of best international practice.

Table 7: Approach Summary Table

Action	***Description***
Site Survey	The identification of existing scenic resources and sensitive receptors in and around the study area to understand the context of the proposed development within its surroundings to ensure that the intactness of the landscape and the prevailing sense of place are taken into consideration.
Project Description	Provide a description of the expected project, and the components that will make up the landscape modification.
Reviewing the Legal Framework	The legal, policy and planning framework may have implications for visual aspects of the proposed development. The heritage legislation tends to be pertinent in relation to natural and cultural landscapes, while Strategic Environmental Assessments (SEAs) for renewable energy provide a guideline at the regional scale.
Determining the Zone of Visual Influence	This includes mapping of viewsheds and view corridors in relation to the proposed project elements, in order to assess the zone of visual

Action	*Description*
	influence of the proposed project. Based on the topography of the landscape as represented by a Digital Elevation Model, an approximate area is defined which provides an expected area where the landscape modification has the potential to influence landscapes (or landscape processes) or receptor viewpoints.
Identifying Visual Issues and Visual Resources	Visual issues are identified during the public participation process, which is being carried out by others. The visual, social or heritage specialists may also identify visual issues. The significance and proposed mitigation of the visual issues are addressed as part of the visual assessment.
Assessing Potential Visual Impacts	An assessment is made of the significance of potential visual impacts resulting from the proposed project for the construction, operational and decommissioning phases of the project. The rating of visual significance is based on the methodology provided by the Environmental Assessment Practitioner (EAP).
Formulating Mitigation Measures	Possible mitigation measures are identified to avoid or minimise negative visual impacts of the proposed project. The intention is that these would be included in the project design, the Environmental Management programme (EMPr) and the authorisation conditions.

3.5 Impact Methodology

The following impact criteria were used to assess visual impacts. The criteria were defined by the Western Cape *DEA&DP Guideline for involving Visual and Aesthetic Specialists in EIA Processes* (Oberholzer, 2005)

Table 8. DEA&DP Visual and Aesthetic Guideline Impact Assessment Criteria Table.

Criteria	**Definition**
Extent	The spatial or geographic area of influence of the visual impact, i.e.: • *site-related:* extending only as far as the activity. • *local:* limited to the immediate surroundings. • *regional:* affecting a larger metropolitan or regional area. • *national:* affecting large parts of the country. • *international:* affecting areas across international boundaries.
Duration	The predicted life-span of the visual impact: • *short term,* (e.g., duration of the construction phase). • *medium term,* (e.g., duration for screening vegetation to mature). • *long term,* (e.g., lifespan of the project). • *permanent,* where time will not mitigate the visual impact.
Intensity	The magnitude of the impact on views, scenic or cultural resources. • *low,* where visual and scenic resources are not affected. • *medium,* where visual and scenic resources are affected to a limited extent. • *high,* where scenic and cultural resources are significantly affected.
Probability	The degree of possibility of the visual impact occurring: • *improbable,* where the possibility of the impact occurring is very low. • *probable,* where there is a distinct possibility that the impact will occur. • *highly probable,* where it is most likely that the impact will occur.

	• *definite,* where the impact will occur regardless of any prevention measures.
Significance	The significance of impacts can be determined through a synthesis of the aspects produced in terms of their nature, duration, intensity, extent and probability, and be described as: • *low,* where it will not have an influence on the decision. • *medium,* where it should have an influence on the decision unless it is mitigated. • *high,* where it would influence the decision regardless of any possible mitigation.

4 PROJECT DESCRIPTION

The following table outlines the project information that was provided by the client that will be incorporated into the assessment and proposed infrastructure relating to the project would include:

The Applicants, Euphorbia PV (Pty) Ltd proposes the construction of the Euphorbia photovoltaic (PV) solar energy facilities (One of three proposed PV solar facilities collectively referred to as the Houthaalboomen North PV cluster) located on a site approximately 10 km north west of the town of Lichtenburg in the North West Province. Each solar PV facility will comprise several arrays of PV panels and associated infrastructure and will have a contracted capacity of up to 100 MW. The development area is situated within the Ditsobotla Local Municipality within the Ngaka Modiri Molema District Municipality and is accessible via the R505, located east of the development area.

An assessment area ranging from 207 - 230 ha is being assessed as part of this EIA process and the infrastructure associated with each 100 MW facility is included in Table 9 below. The proposed solar facility intends to connect to the National Grid via the Watershed Main Transmission Substation (MTS) (approximately 5 km south east of the facility), however, the connection infrastructure associated with this grid solution is being assessed as part of a separate Environmental Application.

Table 9: Project Components Information Table

PV Component	**Specification**
PV modules and mounting structures	5.5m high
Battery Energy Storage System (BESS).	Up to 4 ha Max height (excluding lightning protection) of 3.5m
Site and internal access roads (up to 8m wide).	Up to 8m wide ~4 km long
Auxiliary buildings (22kV or 33kV switch room, gatehouse and security, control centre, office, warehouse, canteen & visitors centre, staff lockers etc.);	3.5m high

Temporary and permanent laydown area;	Approximately 2-5 ha of laydown areas will be required during construction (laydown areas will not exceed 5 ha). A permanent laydown area of a maximum of a 1 ha will remain.
Cabling between the panels, to be laid underground where practical;	

Photographic examples of the visual nature of the proposed PV Facility are located below.

(www.hawaiirenewableenergy.org/Villamesias2, n.d.)

Single portrait module on a tracker (Photo – Cape EAPrac, 2019)

Figure 3: Photographic examples of what the proposed PV could look like.

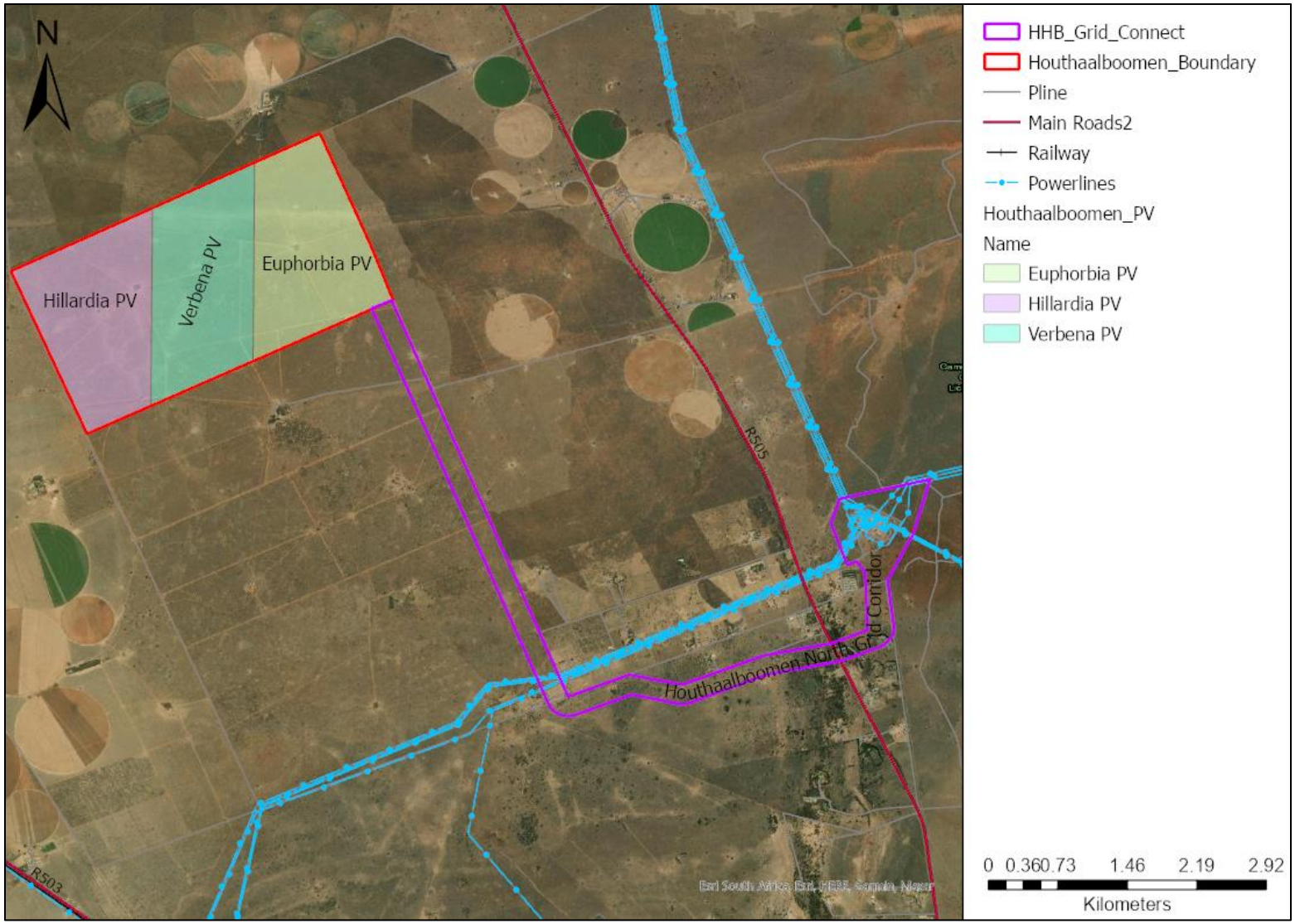


Figure 4: Proposed locality of the Houthaalboomen North Cluster and associated grid connection corridor.

5 LEGAL FRAMEWORK

In order to comply with the Visual Resource Management requirements, it is necessary to relate the proposed landscape modification in terms of international best practice in understanding landscapes and landscape processes. The proposed project also needs to be evaluated in terms of 'policy fit'. This requires a review of National and Regional policy and planning for the area to ensure that the scale, density and nature of activities or developments are harmonious and in keeping with the planned sense of place and character of the area.

5.1 International and National Good Practice

For cultural landscapes, the following documentation provides good practice guidelines, specifically:

- Guidelines for Landscape and Visual Impact Assessment (GLVIA), Second Edition.
- International Finance Corporation (IFC).
- World Bank Group.
- Millennium Ecosystem Assessment (MEA).
- United Nations Educational, Scientific and Cultural Organisation (UNESCO) World Heritage Convention (WHC).

5.1.1 Guidelines for Landscape and Visual Impact Assessment, Second Edition

The Landscape Institute and the Institute of Environmental Management and Assessment (United Kingdom) have compiled a book outlining best practice in landscape and visual impact assessment. This has become a key guideline for LVIA in the United Kingdom. "The principal aim of the guideline is to encourage high standards for the scope and context of landscape and visual impact assessments, based on the collegiate opinion and practice of the members of the Landscape Institute and the Institute of Environmental Management and Assessment. The guidelines also seek to establish certain principles and will help to achieve consistency, credibility and effectiveness in landscape and visual impact assessment, when carried out as part of an EIA" (The Landscape Institute, 2003);

In the introduction, the guideline states that 'Landscape encompasses the whole of our external environment, whether within village, towns, cities or in the countryside. The nature and pattern of buildings, streets, open spaces and trees – and their interrelationships within the built environment – are an equally important part of our landscape heritage" (The Landscape Institute, 2003: Pg. 9). The guideline identifies the following reasons why landscape is important in both urban and rural contexts, in that it is:

- An essential part of our natural resource base.
- A reservoir of archaeological and historical evidence.
- An environment for plants and animals (including humans).
- A resource that evokes sensual, cultural and spiritual responses and contributes to our urban and rural quality of life; and
- Valuable recreation resources (The Landscape Institute, 2003).

5.1.2 International Finance Corporation (IFC)

The IFC Performance Standards (IFC, 2012) do not explicitly cover visual impacts or assessment thereof. Under IFC PS 6, ecosystem services are organized into four categories, with the third category related to cultural services which are defined as "the non-

material benefits people obtain from ecosystems" and "may include natural areas that are sacred sites and areas of importance for recreation and aesthetic enjoyment" (IFC, 2012). However, the IFC Environmental Health and Safety Guidelines for Electric Power Transmission and Distribution (IFC, 2007) specifically identifies the risks posed by power transmission and distribution projects to create visual impacts to residential communities. It recommends mitigation measures to be implemented to minimise visual impact. These should include the siting of powerlines and the design of substations with due consideration to landscape views and important environmental and community features. Prioritising the location of high-voltage transmission and distribution lines in less populated areas, where possible, is promoted.

IFC PS 8 recognises the importance of cultural heritage for current and future generations and aims to ensure that projects protect cultural heritage. The reports define Cultural Heritage as "(i) tangible forms of cultural heritage, such as tangible moveable or immovable objects, property, sites, structures, or groups of structures, having archaeological (prehistoric), paleontological, historical, cultural, artistic, and religious values; (ii) unique natural features or tangible objects that embody cultural values, such as sacred groves, rocks, lakes, and waterfalls" (IFC, 2012). The IFC PS 8 defines Critical Heritage as "one or both of the following types of cultural heritage: (i) the internationally recognized heritage of communities who use or have used within living memory the cultural heritage for long-standing cultural purposes; or (ii) legally protected cultural heritage areas, including those proposed by host governments for such designation" (IFC, 2012).

Legally protected cultural heritage areas are identified as important in the IFC PS 8 report. This is for "the protection and conservation of cultural heritage, and additional measures are needed for any projects that would be permitted under the applicable national law in these areas". The report states that "in circumstances where a proposed project is located within a legally protected area or a legally defined buffer zone, the client, in addition to the requirements for critical cultural heritage, will meet the following requirements:

- Comply with defined national or local cultural heritage regulations or the protected area management plans.
- Consult the protected area sponsors and managers, local communities and other key stakeholders on the proposed project; and
- Implement additional programs, as appropriate, to promote and enhance the conservation aims of the protected area" (IFC, 2012).

5.1.3 Millennium Ecosystem Assessment

In the Ecosystems and Human Well-being document compiled by the Millennium Ecosystem Assessment in 2005, Ecosystems are defined as being "essential for human well-being through their provisioning, regulating, cultural, and supporting services. Evidence in recent decades of escalating human impacts on ecological systems worldwide raises concerns about the consequences of ecosystem changes for human well-being". (Millennium Ecosystem Assessment, 2005)

The Millennium Ecosystem Assessment defined the following non-material benefits that can be obtained from ecosystems*:*

- Inspiration: Ecosystems provide a rich source of inspiration for art, folklore, national symbols, architecture, and advertising.

- Aesthetic values: Many people find beauty or aesthetic value in various aspects of ecosystems, as reflected in the support for parks, scenic drives, and the selection of housing locations.
- Sense of place: Many people value the “sense of place” that is associated with recognised features of their environment, including aspects of the ecosystem.
- Cultural heritage values: Many societies place high value on the maintenance of either historically important landscapes (“cultural landscapes”) or culturally significant species; and
- Recreation and ecotourism: People often choose where to spend their leisure time based in part on the characteristics of the natural or cultivated landscapes in a particular area. (Millennium Ecosystem Assessment, 2005)

The Millennium Ecosystem Assessment Ecosystems and Human Well-being: Synthesis report indicates that there has been a “rapid decline in sacred groves and species” in relation to spiritual and religious values, and aesthetic values have seen a “decline in quantity and quality of natural lands”. (Millennium Ecosystem Assessment, 2005)

5.2 National and Regional Legislation and Policies

In order to comply with the Visual Resource Management requirements, it is necessary to clarify which National and Regional planning policies govern the proposed development area to ensure that the scale, density and nature of activities or developments are harmonious and in keeping with the sense of place and character of the area.

- DEA&DP Visual and Aesthetic Guidelines.
- REDZ status.
- Regional and Local Municipality Planning and Guidelines.

The map below indicates the administrative locality of the proposed development area.

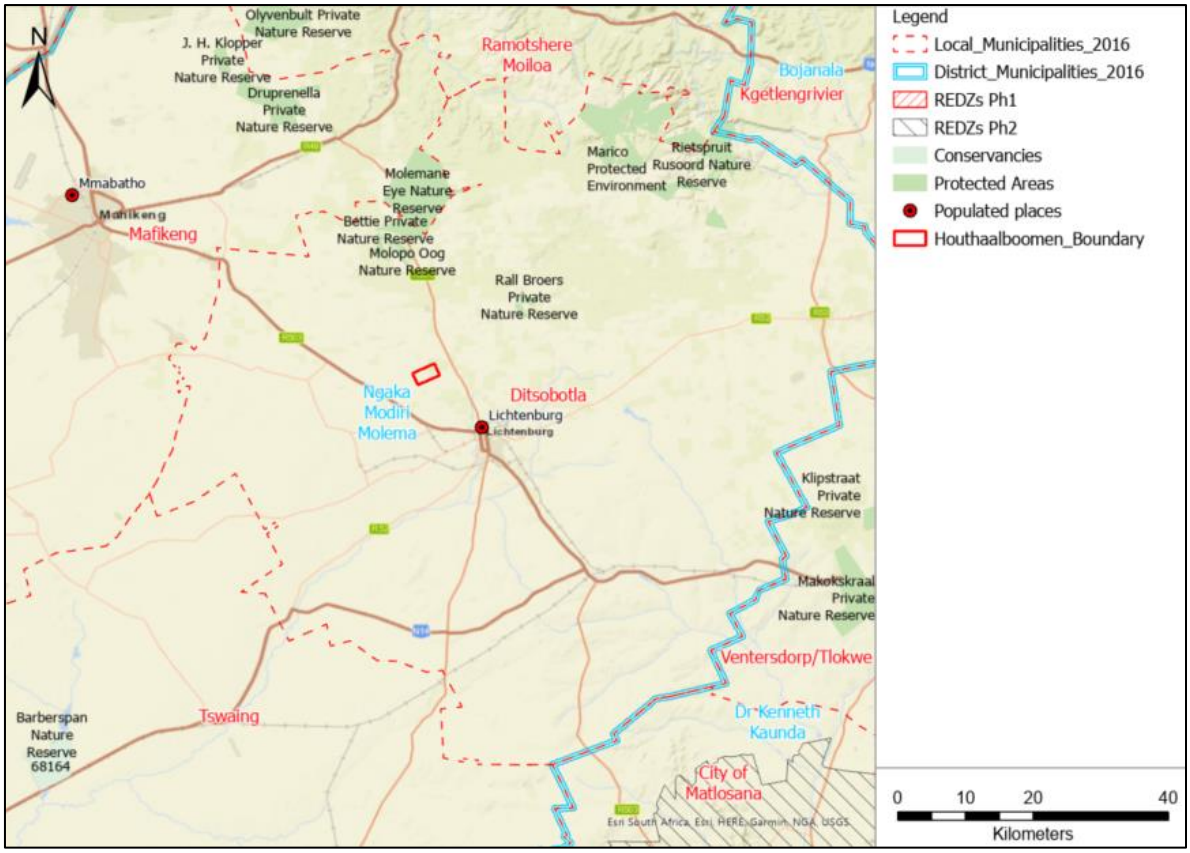


Figure 5. Governance Planning Locality Map.

5.2.1 DEA&DP Visual and Aesthetic Guidelines

Although not located within the Western Cape, reference to the Western Cape Department of Environmental Affairs and Development Planning (DEA&DP) Guideline for involving visual and aesthetic specialists in Environmental Impact Assessment (EIA) processes is provided in terms of southern African best practice in Visual Impact Assessment. The report compiled by Oberholzer states that the Best Practicable Environmental Option (BPEO) should address the following:

- Ensure that the scale, density and nature of activities or developments are harmonious and in keeping with the sense of place and character of the area. The BPEO must also ensure that development must be located to prevent structures from being a visual intrusion (i.e., to retain open views and vistas).
- Long term protection of important scenic resources and heritage sites.
- Minimisation of visual intrusion in scenic areas.
- Retention of wilderness or special areas intact as far as possible.
- Responsiveness to the area's uniqueness, or sense of place." (Oberholzer, 2005)

5.2.2 Renewable Energy Development Zone Status

The study area does not fall within a REDZ area.

5.2.3 Local and Regional Planning.

As indicated in the Figure 5 administrative map on the previous page, the following Table lists the local and regional planning institutions that govern land use change.

Table 10: Governance administrative table

Theme	Name
REDZ	Not applicable
Province	North West Province
District Municipality	Ngaka Modiri Molema District Municipality
Local Municipality	Ditsobotla Local Municipality

The following tables list key regional and local planning that has relevance to the project pertaining to landscape-based tourism, and solar energy projects.

Table 11: Ngaka Modiri Molema (NMMDM) District Municipality Integrated Development Plan 2017-2022 (Ngaka Modiri Molema District Municipality, 2017)

Theme	Requirements	Page
Economic Development 2022	NMMDM underpinned by various development corridors namely: • Platinum Corridor (N4), which stretches from the east to the west of NMMDM connecting Republic of South Africa with Republic of Botswana and Republic of Mozambique. • The N18 Western Frontier Corridor N18; and • N14	19
Environment	Ngaka Modiri Molema District Municipality is well-endowed with natural resources; therefore, environmental conservation is of high importance to the municipality.	31
Economic Development	The Agriculture, Culture and Tourism have been identified as the anchor of Economic Growth especially where poverty, unemployment and inequality are rampant. All other sectors such as mining, manufacturing and retail would serve as offshoot to Agriculture, Culture and Tourism	22
	• The District has an important role to play in setting the framework for growth and outlining the necessary actions to stimulate growth in areas such as innovation, research and development, skills, exports and entrepreneurship. • This also means identifying and supporting business growth in areas where there is the greatest potential, whilst ensuring that the necessary economic infrastructure is in place to capitalize on the existing strength and opportunities.	22
	To facilitate economic development by creating a conducive environment for business development	49

Table 12: Ditsobotla Local Municipality Final Integrated Development Plan 2015/2016 (Ditsobotla Local Municipality, 2015)

Theme	Requirements	Page
Critical Natural Areas	Designating and protecting areas of critical natural capital such as recreational areas, water resource and mineral resources.	64
Open Spaces	• The development of an open space system for the Ditsobotla Local Municipality is aimed at linking all natural elements of value and the "High Environmental Control Zones" through a continuous open space system.	88

Theme	Requirements	Page
	• An isolated open space surrounded by urban settlements or other types of development has little change of sustaining its biodiversity and it is only when the areas are linked into an integrated system that it increases its ability to sustain biodiversity. Elements which could be included in such an open space system include ridges and mountains, proclaimed nature reserves, protected areas, river environments and other potential environmentally sustainable areas. • This open space system area could consist of a number of main components: A corridor along the northern boundary of the municipality from Molopo Eye conservancy, including the northern parts of the municipality up to the intersection of R53 and the R52 in the eastern parts of the municipality. • The possible further westward extension of this open space system to link up with the Malmanies Eye Natural Reserve in the Mafikeng area could be considered.	
	• The upper catchments of the Hartsriver are located in the area southwest of Lichtenburg (between Lichtenburg and Itekeng/Biesiesvlei). This area is important from the point of view that it is the origin of Hartsriver that traverses a number of other municipalities in the western parts of the North West Province. The Hartsriver also feeds Barberspan which is an international RAMSAR site. It is thus necessary to protect the river and the adjacent area within this catchment area from inappropriate forms of development.	89
Mining	There are two important types of mining and quarrying activities which impacts on the spatial development of the Ditsobotla Local Municipality. These are: The quarrying of limestone deposits associated with the manufacturing activities of Lafarge and AfriSam	89
Environmental Protection	The management and monitoring of future spatial development within the Ditsobotla Local Municipality should protect the identified high environmental control zones within the municipality. Development applicants should also be appropriately informed of location of high environmental control zones and the management guidelines for these areas	91

Table 13: Ditsobotla Local Municipality Integrated Development Plan 2020/2021 (Ditsobotla Local Municipality, 2020)

Theme	Requirements	Page
Development	Ditsobotla Local Municipality is categorised by the North West Province as a Priority 1 Investment Areas based on its potential for high economic growth (relative to the rest of the Municipalities) and the high level of needs.	34
Lichtenburg Economy	The North West Spatial Development Framework identified a new Provincial Development Corridor that links Potchefstroom via Coligny and Lichtenburg towards Mafikeng. It is therefore important that local urban planning make provision for the proper alignment of the corridor, and in so-doing, to take full advantage of what the corridor has to offer.	57

Theme	Requirements	Page
	In principle the identification of a corridor on Provincial level implies that such a route will be prioritised as an important link and transport corridor. Therefore, it could be expected that such a corridor will also be prioritized from a maintenance and upgrade point of view.	
Electricity	Government has committed to universal access to electricity by 2014. Although the White Paper on Energy acknowledges that the municipalities have a limited role in energy management, it argues that they are responsible for economic and physical planning, and as such, are concerned with the supply and use of energy. Similarly, because all energy-related policy programmes and projects are implemented in urban areas, municipal government will have to coordinate its development activities with those of energy stakeholders and role-players, to ensure alignment and integrated development.	90
Vegetation	The vegetation of Ditsobotla is mostly Vaal-Vet Sandy Grassland (46%), Western Highveld Sandy Grassland (21%), Rand Highveld Grassland (11%), Highveld Alluvial Vegetation especially along the Groot Hartsriver. On the northern part of Ditsobotla municipal area, as well as Moot Plains Bushveld (6%) is found.	25
	The Ditsobotla local municipality is located within the Grassland biome. The topography of this biome is mainly flat and rolling but includes the escarpment itself with altitudes varying from near sea level to 2 850m above sea level.	24
Rivers	The Hartsrivier and Groot Hartsrivier draining in a south western direction of Itsoseng and Biesiesvlei. This river has its origin in the areas east and south of Lichtenburg. An important tributary of the Hartsrivier is Tweelingspruit, which north of Biesiesvlei.	23

5.3 Policy Fit

Policy fit refers to the degree to which the proposed landscape modifications align with International, National, Provincial and Local planning and policy. In terms of international best practice and management of significant landscapes, there is a good policy fit as no significant landscape features are located within the project Zone of Visual Influence (ZVI).

In terms of regional and local planning, there is mention of the importance of the Lichtenberg Game Breeding area to the east of the proposed site, with reference to creating an ecological corridor. However, due to the flat terrain and the surrounding thornveld vegetation, the project ZVI does not extent into the game breeding areas. There are also PV projects proposed between the site and the breeding ground. As such, the policy fit at a local and regional level is rated **Medium to High +VE.**

6 BASELINE VISUAL INVENTORY ASSESSMENT

Landscape character is defined by the U.K. Institute of Environmental Management and Assessment (IEMA) as the 'distinct and recognisable pattern of elements that occurs consistently in a particular type of landscape, and how this is perceived by people. It reflects particular combinations of geology, landform, soils, vegetation, land use and human settlement'. It creates the specific sense of place or essential character and 'spirit of the place' (IEMA, 2002). This section of the VIA identifies the main landscape features that

define the landscape character, as well as the key receptors that make use of the visual resources created by the landscape.

6.1 Site Investigation

A field survey undertaken was on the 21 February 2022 to inform the landscape and visual impact assessment. During the site visit, photographs were taken from each viewpoint, and the view direction and GPS location captured. The main land use will be documented as well as the nature of the dominant landscape in the vista. In order to represent views of the proposed landscape modification by means of photomontages for assessment purposes, panoramic photographs were also taken from key viewpoints.

Table 14: List of Sampling Sites where the Landscape and Visual Survey was Conducted

ID	NAME	Context	Direct	REMARKS	REC_TIME	LAT	LONG
6	Grid connect	Receptor	N	Proposed power lines crossing of the R505	01/21/2022 15:11:32.910 SAST	-26.1028	26.14044
7	Grid connect	Receptor	SW	Close proximity to small holding residence but with local vegetation screening restricting views from the residence.	01/21/2022 15:16:14.041 SAST	-26.1068	26.12642
8	Grid connect	Landscape Character	SE	Existing power lines along the proposed corridor increasing the VAC levels and degrading local landscape character.	01/21/2022 15:24:47.542 SAST	-26.1041	26.11205
9	Grid Connect Receptor	Receptor	E	Photograph of the farmstead located to the east of the proposed grid connect with no residential dwellings visible.		0	0
10	R505	Receptor	W	View west from the R505 with medium sized trees screening clear views of the proposed Euphorbia PV site.	01/21/2022 15:43:19.506 SAST	-26.0644	26.11457
12	Hillardia PV Site	Landscape Character	NEE	View down the fence line located on the southern boundary of Hillardia PV characterised by flat, grass covered terrain with small, scattered trees.	01/21/2022 16:17:48.774 SAST	-26.0778	26.0693
13	Verbena PV Site	Landscape Character	NE	View down the wooden 88kV power line with small trees re emphasising the aesthetic nature of the rural agricultural landscape.	01/21/2022 16:27:29.329 SAST	-26.0753	26.07781

14	Farmstead 10	Receptor	NW	Views from the Euphorbia PV site towards the farmstead located 500m to the north of the project.	01/21/2022 16:28:52.867 SAST	-26.051	26.08633
15	Euphorbia PV Site	Landscape Character	N	View of the flat terrain and fenced grassland paddocks offering limited visual appeal.	01/21/2022 16:33:37.895 SAST	-26.0701	26.08928

The site investigation also flagged landscape features and receptors that should be taken into consideration, and that were communicated to the EAP for early planning. The following landscape value issues were flagged:

- Rural agricultural sense of place.
- Limited scenic resources.
- Close proximity to small holdings that are developing into a semi-industrial landscape context.

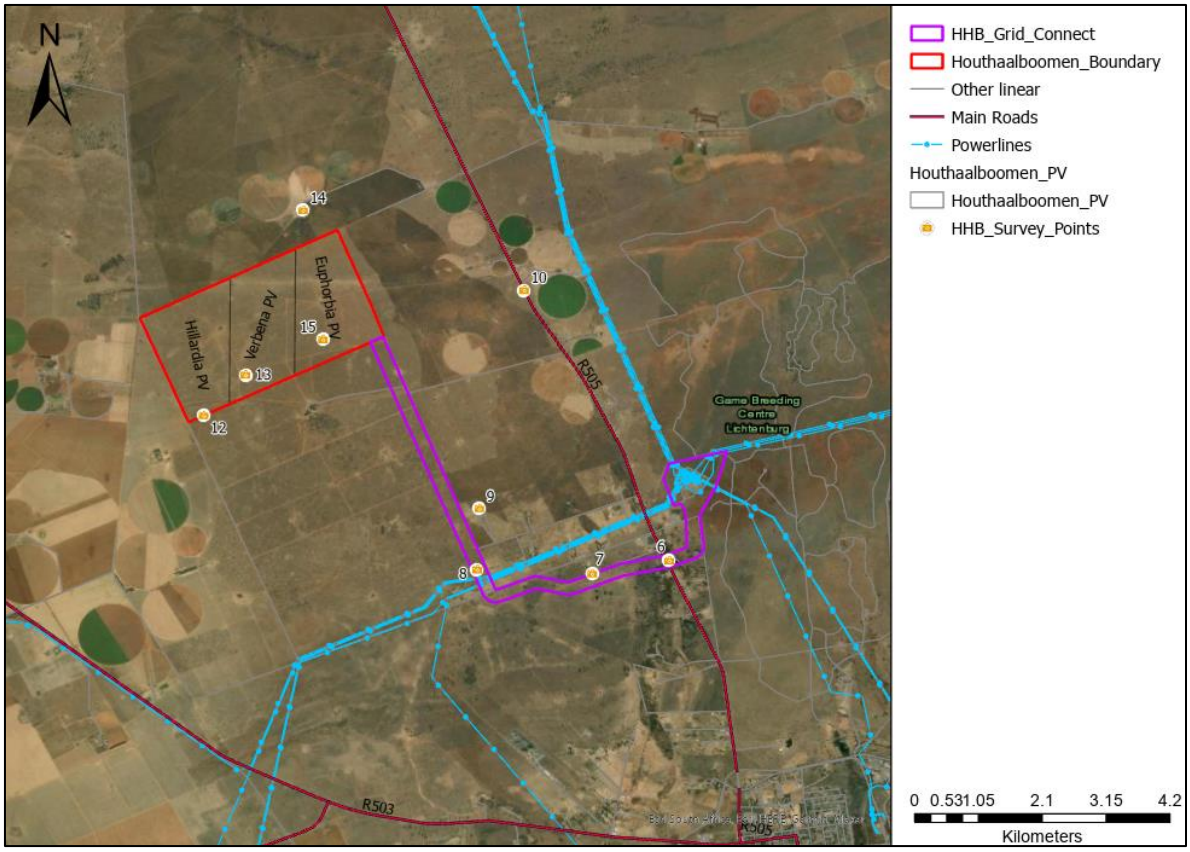


Figure 6: Survey Point Locality Map

6.2 Landscape Context

6.2.1 Regional Locality

Lichtenburg town is today the centre of a huge farming district where maize, groundnuts and sunflower seeds are the main crops. The biggest pure red diamond ("pigeon blood red") in the world was found here. From 1925 to 1935 diamonds were discovered, and over 7 million carats of diamonds have been found in the region. Lichtenburg Game Breeding Centre

outside town provides a good network of roads facilitate the viewing of animals. (Places.co.za, n.d.)

The study area is located within the visual influence of the town industry, namely the Lichtenburg LaFarge Cement Factory that is a large industrial structure that is dominating landscape feature in the regional landscape.

Figure 7. Photograph of the Lichtenburg LaFarge Cement Factory that forms a background view to much of the regional landscape.

6.2.2 Land use and Main Infrastructure

Land use is a crucial factor in determining landscape character, especially regarding the Visual Absorption Capacity (VAC) of the landscapes. Oberholzer defines VAC as the potential of the landscape to conceal the proposed project (Oberholzer, 2005). General land uses of the area are described making use of Open-Street Mapping vector data, overlaid onto ArcGIS World Satellite Imagery. Infrastructure is often a by-product of land use with the main road, rail and power lines a result of the historical development of the region. The current land use of the proposed properties is cattle and maize farming. Multiple centre pivots are visible in the landscape emphasising the intensive farming nature of the area. Within the regional landscape context are small-holding type properties to the northeast of the town of Lichtenburg (south of the study area). This increases the number of receptors but is also manifesting in a semi-industrial land use where many of these properties are being used for business activities.

As can be seen in the map below, the area is also strongly characterised by power line infrastructure routed to the Eskom Watershed Substation.

Figure 8. Photograph on site depicting the cattle farming activities currently taking place within the project area.

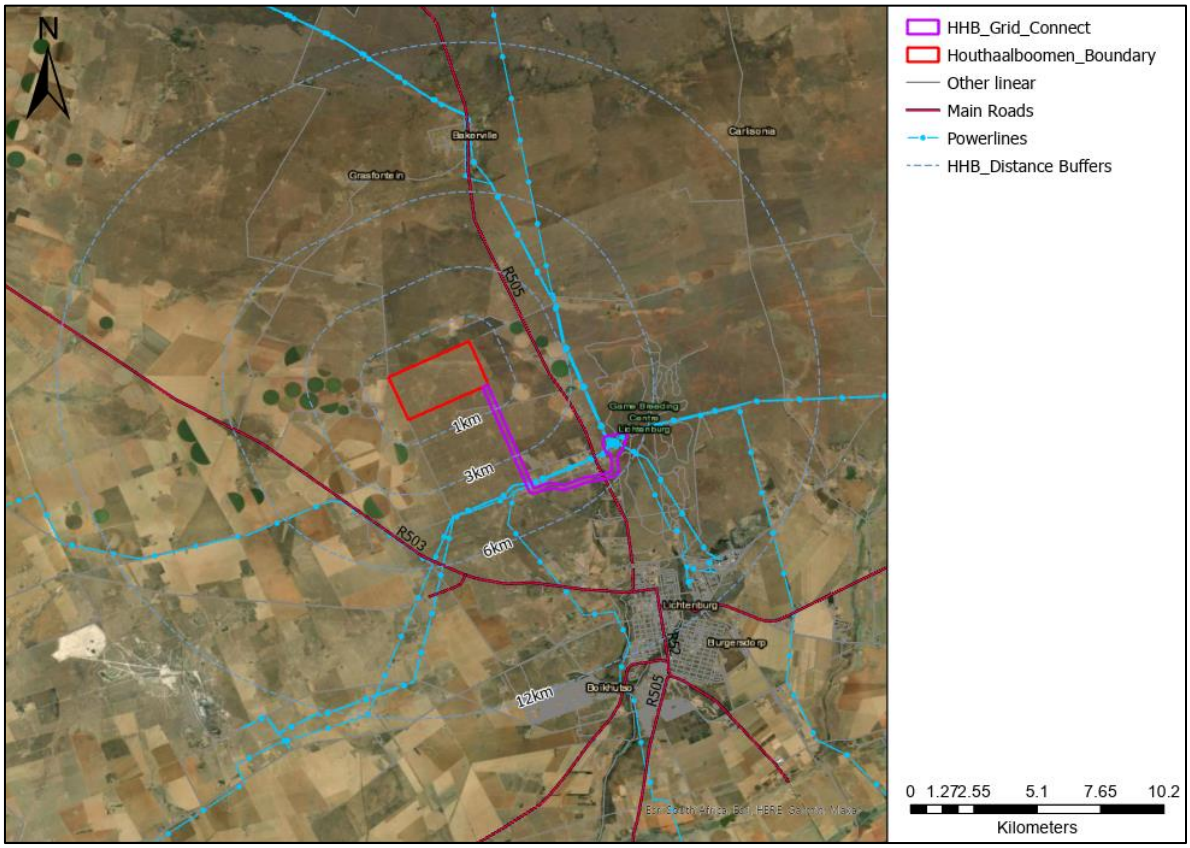


Figure 9. Land use map depicting Open-Street spatial data overlay onto ESRI satellite imagery.

6.2.3 Conservation

A regional planning map was generated and included conservation protection areas as a layer. As can be seen on the map in Figure 5, the only protected conservation area in the region was the Lichtenburg Game Breeding Area located to the east. As previously indicated, due to the flat terrain and thornveld vegetation, the project ZVI does not extend to the east. This area has also been proposed for a PV project and as such would be subject to a land use change.

6.2.4 Vegetation

Making use of the SANBI information sources, the main vegetation type was identified as Carltonville Dolomite Grasslands located within a Grassland Biome and the Dry Highveld Grassland Bioregion. This is reflected in the site survey where grassland was the dominant vegetation type, but also applicable to the landscape character where the Thornveld type trees, that are small to medium in size, do also add to the local landscape character. This indicates that planting of similar trees can be effective in screening from receptors sensitive to landscape change should this be a requirement.

Figure 10. Acacia type thorn trees adding to the local sense of place.

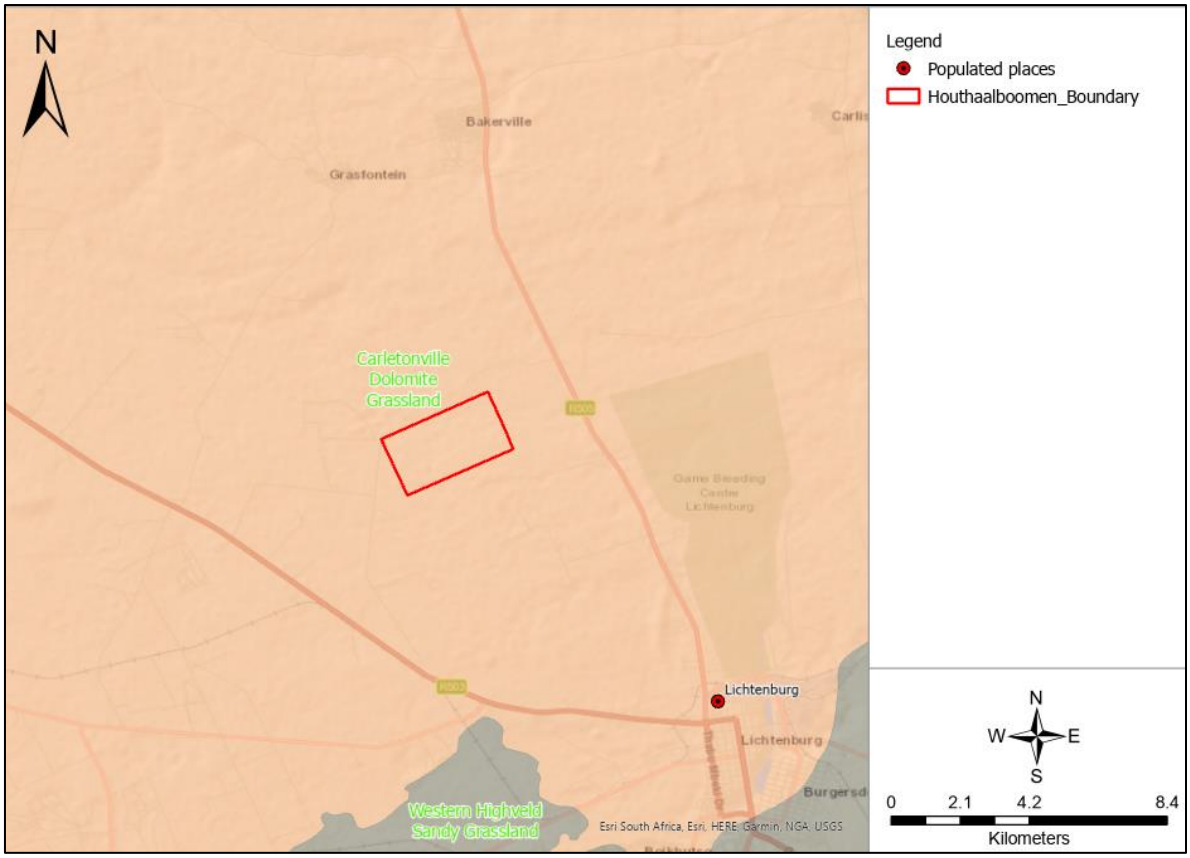


Figure 11: Vegetation Maps of satellite imagery and lower SANBI vegetation classification map.

6.2.5 Renewable Energy Projects

Although not located within a REDZ area, there are numerous proposed PV projects located within the expected project ZVI. The site does, however, fall within a strategic transmission corridor associated with the REDZ. The site visit found that none of the authorised projects were yet to be constructed. Of interest is that much of the proposed PV authorised was in the vicinity of the Lichtenberg Breeding Grounds. The close proximity of the other proposed PV projects to the proposed development area does raise an issue in terms of cumulative visual massing effect should all the PV projects be constructed. This issue is flagged as a low probability risk but would need to be addressed in the impact assessment phase to ensure that the existing rural agricultural landscape sense of place is retained as these agrarian features do add to the regional scenic quality and sense of place.

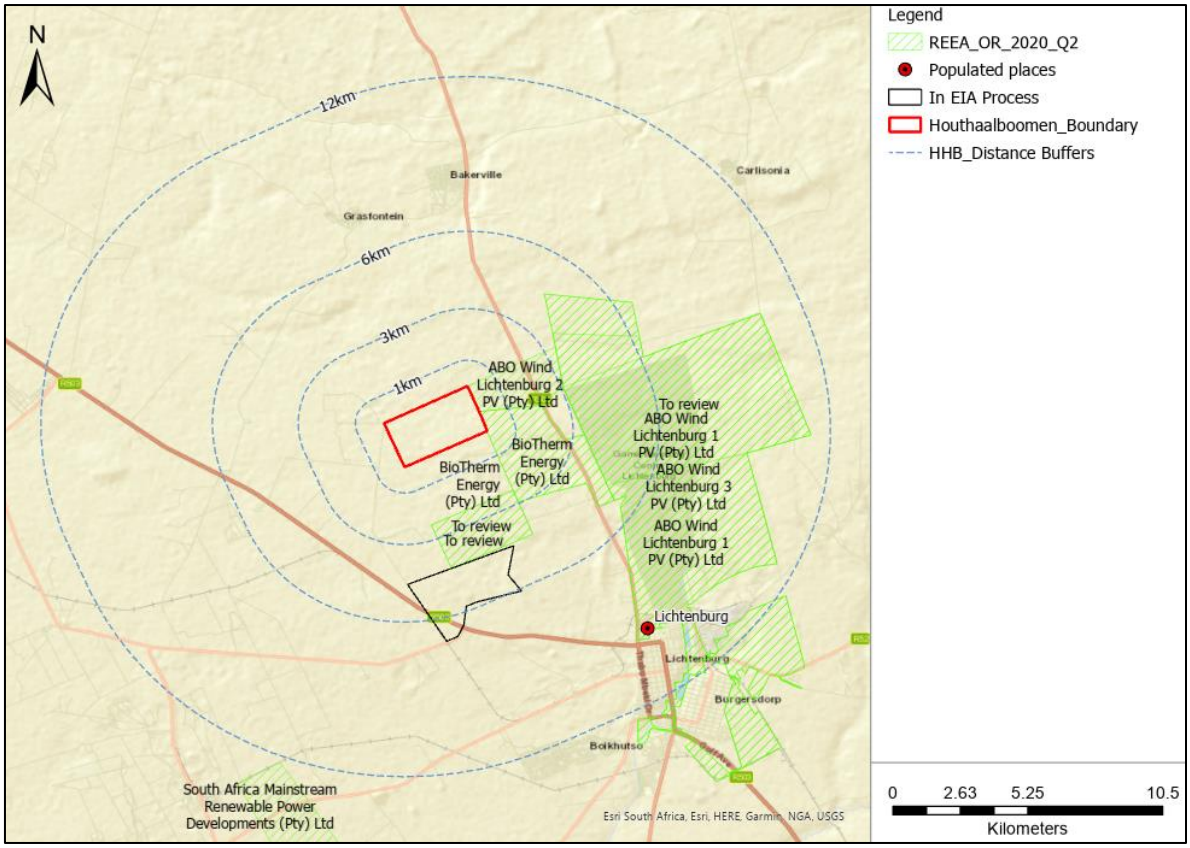


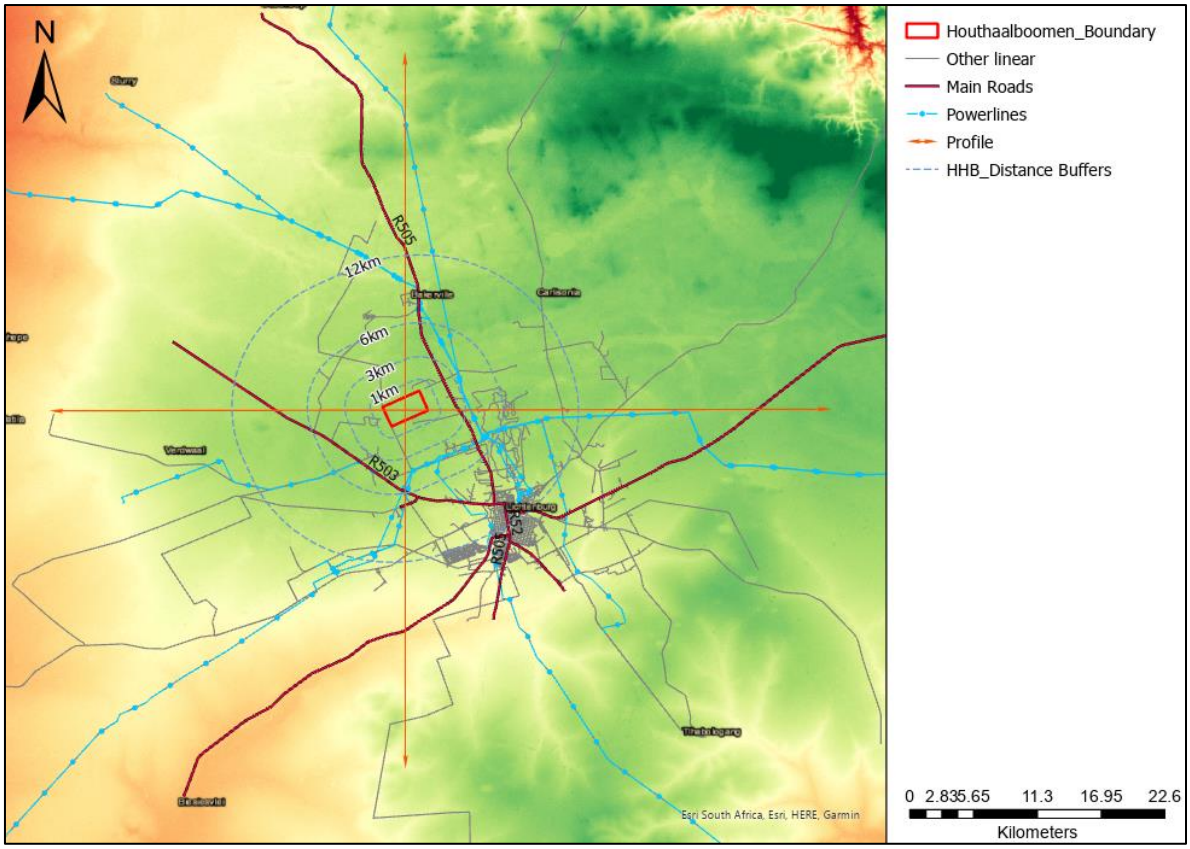
Figure 12. DEA REEA 2021 Renewable Energy Mapping depicting the proposed RE projects surrounding the study area.

6.2.6 Regional Topography

Regional and local topography has the potential to strongly influence landscape character, as well as the extent of the Zone of Visual Influence. In order to better understand these aspects of the study, a Digital Elevation Model was generated making use of the NASA STRM digital elevation model.

Due to the relatively flatter nature of the terrain, the zone of visual influence is likely to be contained to some degree as slight regional undulation and local vegetation screening is likely to reduce the regional ZVI.

In terms of the South to North Profile, the elevation range is from 1400mamsl in the south at the location of the Grootharts River, to a high of 1522mamsl in the north. The 122m spread over a distance of 63km re-emphasises the flat nature of the terrain. The West to East Profile also reflects a similar elevation range, with no significant landforms and the regional terrain predominantly flat, with some lower lying areas associated with hydrological drainage lines of the Grootharts River to the south.



South to North Profile

West to East Profile

Figure 13. Regional terrain model depicting distance buffers around the study area and the profile lines locality.

6.2.7 Site Topography

As slopes have a strong influence on landscape character and can also result in large cut and fills from the development of linear features such as roads, and platforms, a slope analysis was undertaken as seen in Figure 14 below. The mapping analysis found no indication of steep terrain that could influence landscape character or would need to inform the project development. This landform context was confirmed during the site visit.

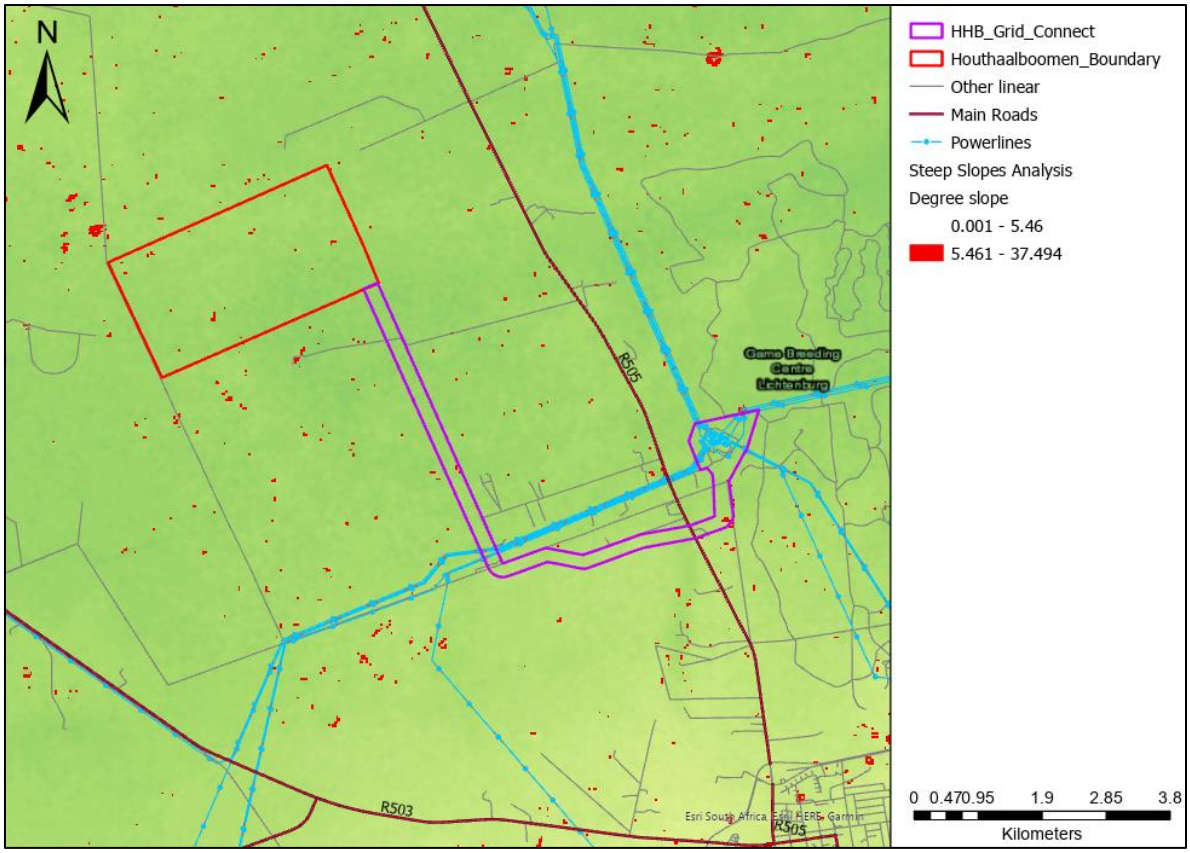


Figure 14. Steeper slopes (1 in 10m) mapping where landscape scarring or erosion could take place.

6.3 Project Zone of Visual Influence

The visible extent, or viewshed, is "the outer boundary defining a view catchment area, usually along crests and ridgelines" (Oberholzer, 2005). In order to define the extent of the possible influence of the proposed project, a viewshed analysis was undertaken from the proposed site at a specified height above ground level as indicated in the Table 1 below, making use of open-source NASA ASTER Digital Elevation Model data (NASA, 2009). The extent of the viewshed analysis was restricted to a defined distance that represents the approximate zone of visual influence (ZVI) of the proposed activities, which takes the scale, and size of the proposed projects into consideration in relation to the natural visual absorption capacity of the receiving environment. The maps are informative only as visibility tends to diminish exponentially with distance, which is well recognised in visual analysis literature (Hull & Bishop, 1988).

6.3.1 Viewshed Analysis

A viewshed analysis was undertaken for the site making use of NASA SRTM 30m Digital Elevation Model data. The Offset Height reflects the height value representing the project height (worst case scenario) of the respective project component. The Capped Extent refers to the limitation placed on the viewshed taking into consideration the expected distance when the proposed landscape change would not be clearly noticeable.

Table 15: Proposed Project Heights Table

Project Component	Offset Height (m)	Capped extent
PV Panels	5.5m	24km

As can be seen in the approximate viewshed depicted in Figure 15 on the following page, the viewshed extent is likely to be moderated across the region extending mainly to the northeast and southwest beyond the High Exposure distance area. This is due to the flat terrain with slight elevation allowing the limited height PV panels landscape change to be contained to the local extent. For these reasons, the ZVI is rated as **Medium to Low** and is likely to be contained within the High Exposure 3km distance from the site. There will, however, be localised pockets within the 6km distance zone, where the visual impacts are Probable. Outside of this distance zone, visual impacts are possible but unlikely to take place

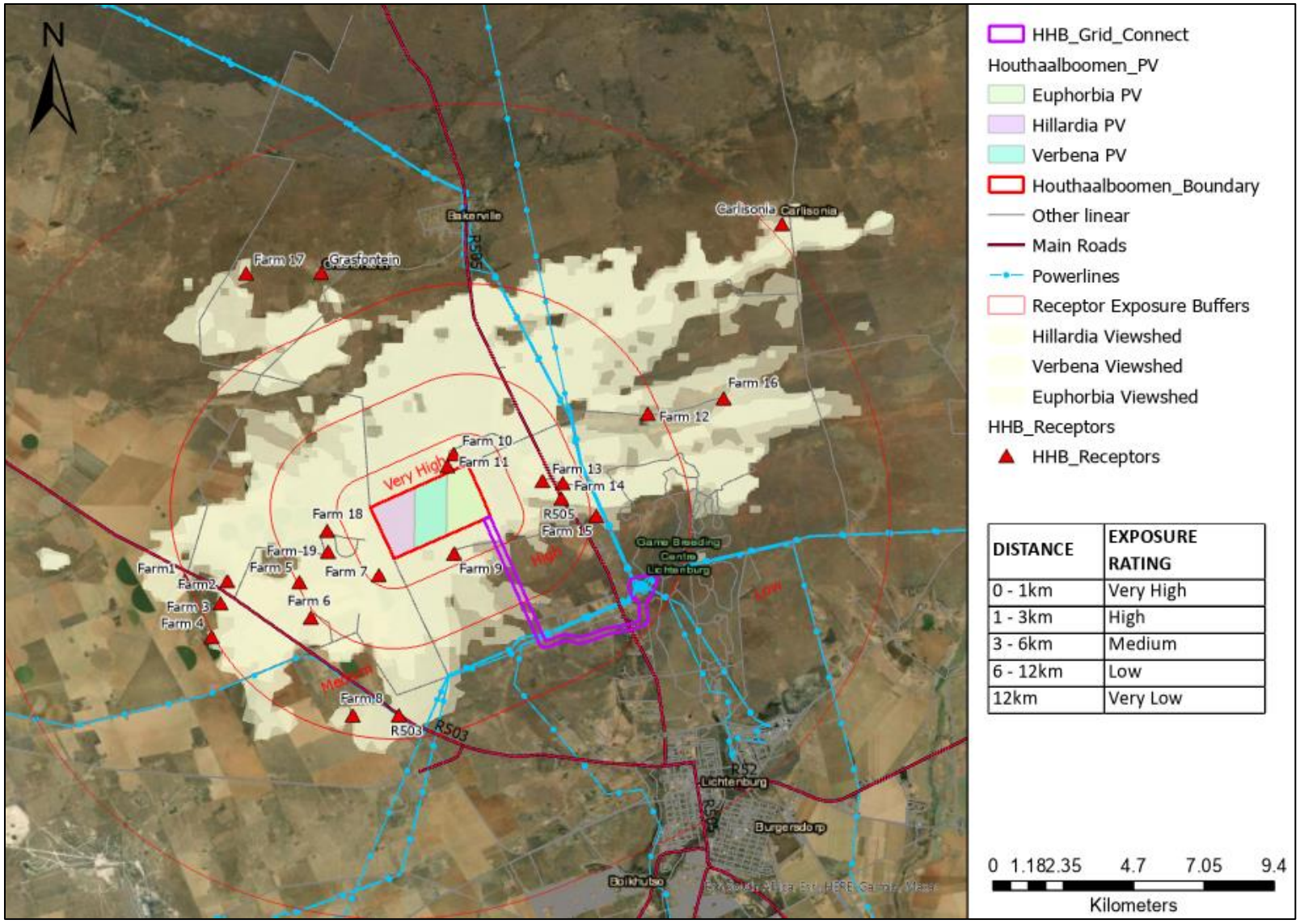


Figure 15. Expected combined project viewshed and exposure generated from 5.5m height above ground from the PV site corners.

6.3.2 Key Observation Points

As defined in the methodology, KOPs are defined by the Bureau of Land Management as the people (receptors) located in strategic locations surrounding the property that make consistent use of the views associated with the site where the landscape modifications are proposed. The following table lists the receptors identified within the ZVI and motivates if they have significance and should be defined as KOP for further evaluation in the impact assessment phase. The receptors located within the ZVI and KOPs view lines are mapped on the following page in Figure 16.

Table 16: Receptor and KOP Motivation Table.

ID	Name	Type	Exposure	KOP	Motivation
2	Farm1	Farm	Low	No	Low Exposure and flat terrain limiting clear visibility.
3	Farm2	Farmstead	Medium	No	Medium Exposure and flat terrain limiting clear visibility.
4	Farm 3	Farmstead	Medium	No	Medium Exposure and flat terrain limiting clear visibility.
5	Farm 4	Farmstead	Low	No	Low Exposure and flat terrain limiting clear visibility.
6	Farm 5	Farmstead	High	No	High Exposure by well screening by local vegetation.
7	Farm 6	Farmstead	Medium	No	Medium Exposure and flat terrain limiting clear visibility.
8	Farm 7	Farmstead	Very High	No	Well screened by low tree vegetation.
9	Farm 8	Farmstead	Medium	No	Medium Exposure and flat terrain limiting clear visibility.
10	Farm 9	Farmstead	Very High	Yes	Well screened by low tree vegetation but Very High Exposure.
11	Farm 10	Farmstead	Very High	Yes	Very High Exposure
13	Farm 12	Farmstead	Medium	No	Medium Exposure and flat terrain limiting clear visibility.
14	Farm 13	Farmstead	High	No	High Exposure by well screening by local vegetation.
15	Farm 14	Farmstead	High	No	High Exposure by well screening by local vegetation.
16	Farm 15	Farmstead	Medium	No	Medium Exposure and flat terrain limiting clear visibility.
17	Farm 16	Farmstead	Low	No	Low Exposure and flat terrain limiting clear visibility.
18	Carlisonia	Informal Township	Very Low	No	Distance limits visibility.
19	R503	Main Road	Medium	No	Flat terrain and higher VAC levels due to rail and power line infrastructure.

20	Farm 17	Farmstead	Low	No	Low Exposure and flat terrain limiting clear visibility.
21	Grasfontein	Informal Settlement	Low	No	Distance reduces clear visibility.
22	R505	Main Road	High	Yes	High Visual Exposure and road views corridor.
23	Farm 18	Farmstead	High	Yes	High Exposure by well screening by local vegetation.
24	Farm 19	Farmstead	High	No	High Exposure by well screening by local vegetation.

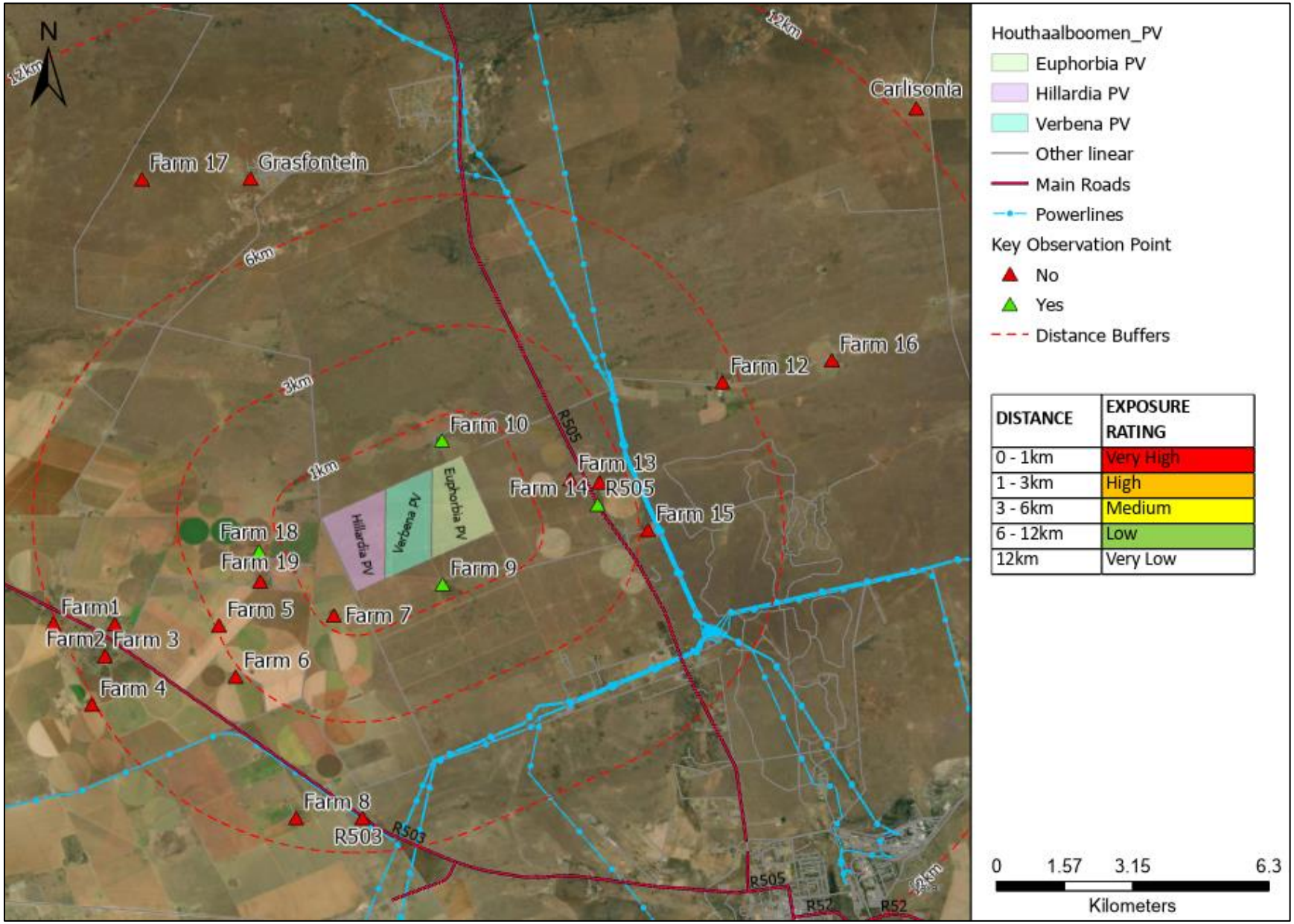


Figure 16: Receptor and KOP locality map

7 VISUAL RESOURCE MANAGEMENT

In terms of the VRM methodology, landscape character is derived from a combination of scenic quality, receptor sensitivity to landscape change, and distance of the proposed landscape modification from key receptor points. Making use of the key landscape elements defined in the landscape contextualisation sections above, landscape units are defined which are then rated to derive their intrinsic scenic value, as well as how sensitive people living in the area would be to changes taking place in these landscapes.

7.1 Physiographic Rating Units

The Physiographic Rating Units are the areas within the proposed PV development area that reflect specific physical and graphic elements that define a particular landscape character. These unique landscapes within the project development areas are rated to assess the scenic quality and receptor sensitivity to landscape change, which is then used to define a Visual Resource Management Class for each of the site's unique landscape/s. The exception is Class I, which is determined based on national and international policy / best practice and landscape significance and as such are not rated for scenic quality and receptor sensitivity to landscape change. Based on the SANBI mapping and the site visit to define key landscape features, the following broad-brush vegetation were tabled.

The Site Locality Map with a satellite image underlay, is located in Figure 17 below. The property is currently zoned "Agriculture 1", and the current land use of the proposed properties is agricultural with cattle farming carried out in this environment. Man-made modifications associated with the cattle farming are isolated farmsteads, farm tracks, fences and water reservoirs. These features are small in scale in the landscape and do not detract from the sense of place. Only a single physiographic region is thus defined as listed in Table 17 below.

Table 17: Physiographic Landscape Rating Units.

Landscapes	Motivation
Flat terrain grasslands	Flat terrain with agricultural related changes to the grassland vegetation.

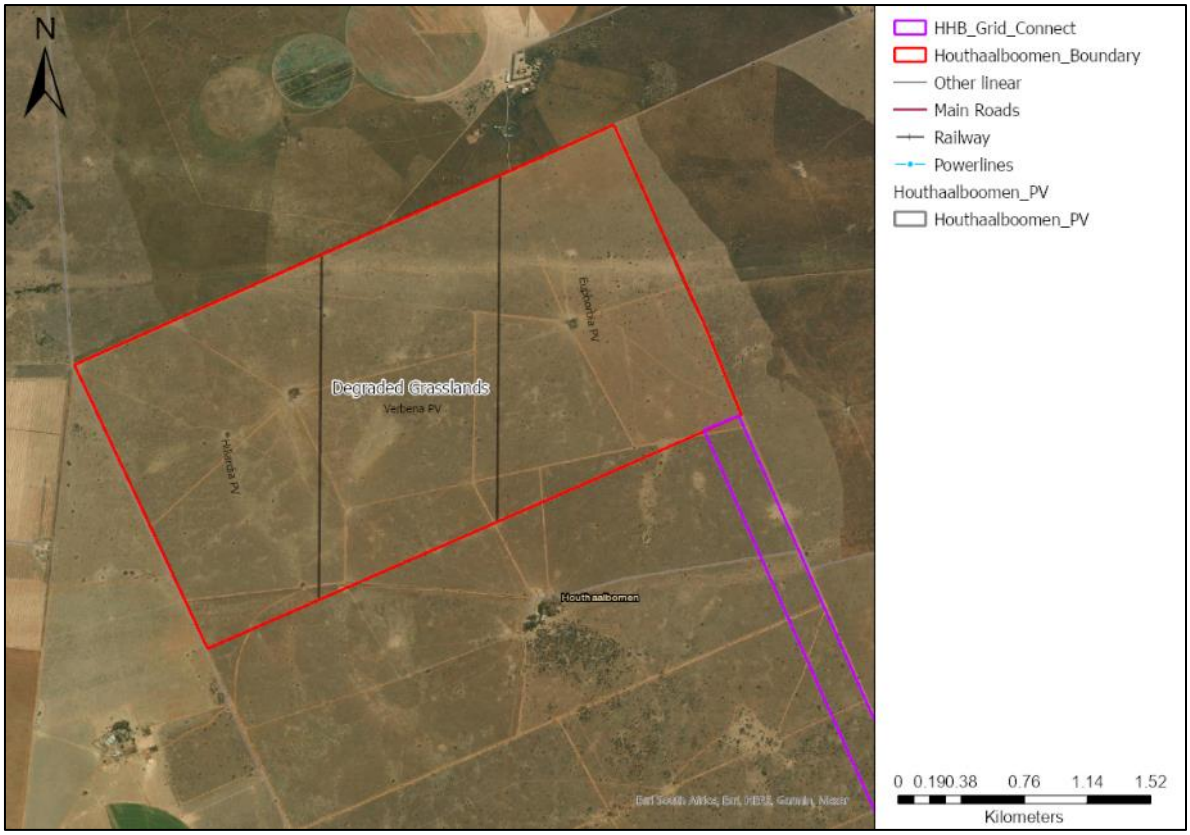


Figure 17: Site Satellite Image Map depicting uniform terrain and vegetation.

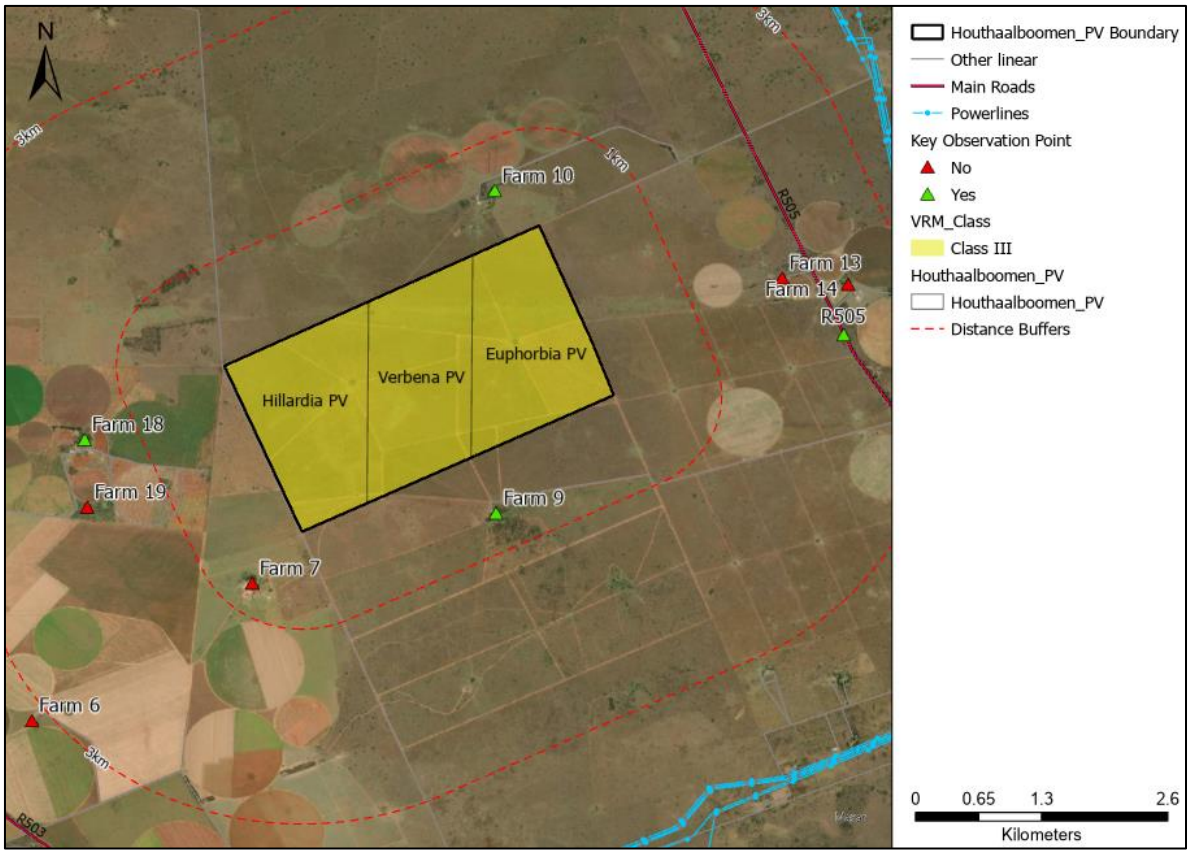


Figure 18: Visual Resource Management Class Map with identified KOPs.

Table 18: Scenic Quality and Receptor Sensitivity Rating.

Landscape Rating Units	**Scenic Quality**									**Receptor Sensitivity**						**VRM**	
	A= scenic quality rating of ≥19; B = rating of 12 – 18, C= rating of ≤11									H = High; M = Medium; L = Low							
Attribute	**Landform**	**Vegetation**	**Water**	**Colour**	**Scarcity**	**Adjacent Landscape**	**Cultural Modifications**	**Sum**	**Rating**	**Type of Users**	**Amount of Use**	**Public Interest**	**Adjacent Land Uses**	**Special Areas**	**Rating**	**Inventory Class**	**Management Class**
Ecologically Sensitive	**(Class I is not rated)**															**I**	**I**
Agriculturally transformed Grasslands	1	1	1	2	1	2	0	**8**	**C**	M	L	L	H	L	**M**	**IV**	**III**

Red colour indicates change in rating from Visual Inventory to Visual Resource Management Classes motivated in the following section.

The ***Scenic Quality*** scores are totalled and assigned an A (High scenic quality), B (Moderate scenic quality) or C (Low scenic quality) category based on the following split: *A= scenic quality rating of ≥19; B = rating of 12 – 18, C= rating of ≤11* (USDI., 2004).
Receptor Sensitivity levels are a measure of public concern for scenic quality. Receptor sensitivity to landscape change is determined by rating the key factors relating to the perception of landscape change in terms of Low to High.

7.2 Scenic Quality Assessment

The scenic quality of the portions of the site transformed by agriculture is rated **Low**. This is due to the flat terrain that has no water features, limited vegetation and associated colours, is not a scarce visual resource and is partially degraded by agricultural practice. The only value element is the Adjacent Scenery which includes the rolling grasslands of the region that do add value. The overall sense of place is that of a rural, grassland agricultural landscape that does not offer much in terms of scenic resources.

7.3 Receptor Sensitivity Assessment

Receptor sensitivity to landscape changes is rated **Medium**. It was found that receptor sensitivity to the current landscapes would be Moderate to Low. This is mainly due to the close proximity of the surrounding farmsteads. However, the area has limited visual resources and the strong presence of the adjacent Eskom power line does reduce the likelihood of the receptors being sensitive to landscape change on the site.

7.4 Visual Resource Management (VRM) Classes

As mapped in Figure 18, the BLM has defined four Classes that represent the relative value of the visual resources of an area and are defined making use of the VRM Matrix in Table 18:

i. **Classes I and II** are the most valued
ii. **Class III** represent a moderate value
iii. **Class IV** is of least value

7.4.1 Class I

Class I is assigned when legislation restricts development in certain areas. The visual objective is to preserve the existing character of the landscape, the level of change to the characteristic landscape should be very low and must not attract attention. A Class I visual objective was assigned to the following features within the proposed development area due to their protected status within the South African legislation:

- Any river / streams and associated flood lines buffers identified as significant in terms of the WULA process (NA)
- Any wetlands identified as significant in terms of the WULA process.
- Any ecological areas (or plant species) identified as having a high significance.
- Any heritage area identified as having a high significance.

7.4.2 VRM Class II

The Class II objective is to retain the existing character of the landscape and the level of change to the characteristic landscape should be low. The proposed development may be seen but should not attract the attention of the casual observer, and should repeat the basic elements of form, line, colour and texture found in the predominant natural features of the characteristic landscape.

- NA

As no significant visual resources were identified on the site, no Visual Management Class II was assigned.

7.4.3 VRM Class III

The Class III objective is to partially retain the existing character of the landscape, where the level of change to the characteristic landscape should be Moderate. Management activities may attract attention but should not dominate the view of the casual observer, and changes should repeat the basic elements found in the predominant natural features of the characteristic landscape. The following landscape was defined as having Class III Visual Objectives where development would be most suitable:

- Grasslands.

Although the Visual Inventory was assigned a Class IV due to Low Scenic Quality and Medium Receptor Sensitivity, a Visual Management Class III was assigned to the Grasslands areas as the current zoning of the property is Agricultural and the setting is rural where scenic resource should be maintained in surrounding landscapes to some degree.

7.4.4 VRM Class IV

As the area is zoned agricultural and located adjacent to an area that does have scenic value and could carry tourist receptors in the area region, no Class IV areas were defined.

8 VISUAL IMPACT ASSESSMENT

Impacts are defined in terms of the standardised impact assessment criteria provided by the environmental practitioner. Using the defined impact assessment criteria, the potential environmental impacts identified for the project were evaluated according to severity, duration, extent and significance of the impact. The potential occurrence and cumulative impact (as defined in the methodology) was also assessed. In order to better understand the nature of the severity of the visual impacts, a Contrast Rating exercise was undertaken.

8.1 Contrast Rating from Key Observation Points

As indicated in the methodology, a contrast rating is undertaken to determine if the VRM Class Objectives are met. The suitability of a landscape modification is assessed by comparing and contrasting the existing receiving landscape to the expected contrast that the proposed landscape change will generate. This is done by evaluating the level of change to the existing landscape by assessing the line, colour, texture and form, in relation to the visual objectives defined for the area.

The following criteria are utilised in defining the DoC:

- **None**: The element contrast is not visible or perceived.
- **Weak**: The element contrast can be seen but does not attract attention.
- **Moderate**: The element contrast begins to attract attention and begins to dominate the characteristic landscape.
- **Strong**: The element contrast demands attention, will not be overlooked, and is dominant in the landscape.

The expected positioning of the PV area in the landscape was provisionally depicted on KOP photographs in the Annexure. The following table identifies the KOPs that are used to assess the suitability of the landscape change.

Table 19: Contrast Rating Key Observation Points Table

	Exposure			Landscape Elements					
Key Observation Point	**Distance**	**Exposure**	**Mitigation**	**Form**	**Line**	**Colour**	**Texture**	**Degree of Contrast**	**Visual Objectives Met?**
R505	2.2km	Medium to High	W/Out	W	W	W	W	MS	Yes
			With	Not required					
Farm 9	600m	Very High	W/Out	W	S	S	S	S	No
			With	W	S	M	M	M	Yes
Farm 10	518m	Very High	W/Out	W	S	S	S	S	No
			With	W	S	M	M	M	Yes

** S = Strong, M = Medium, W = Weak, N = None*

R505 Road

Located 2.2km to the east of the property, the R505 road receptors experience lower levels of visual exposure. The thornveld trees that are sparsely distribute in the area do assist in reducing visual intensity, effectively benchmarking the existing rural sense of place of the road. The area is also characterised by irrigation intensive agriculture that increases the VAC levels to some degree. Mitigation is not required but raising of the PV height above the proposed 5m is likely to result in strong levels of visual intrusion and is not recommended.

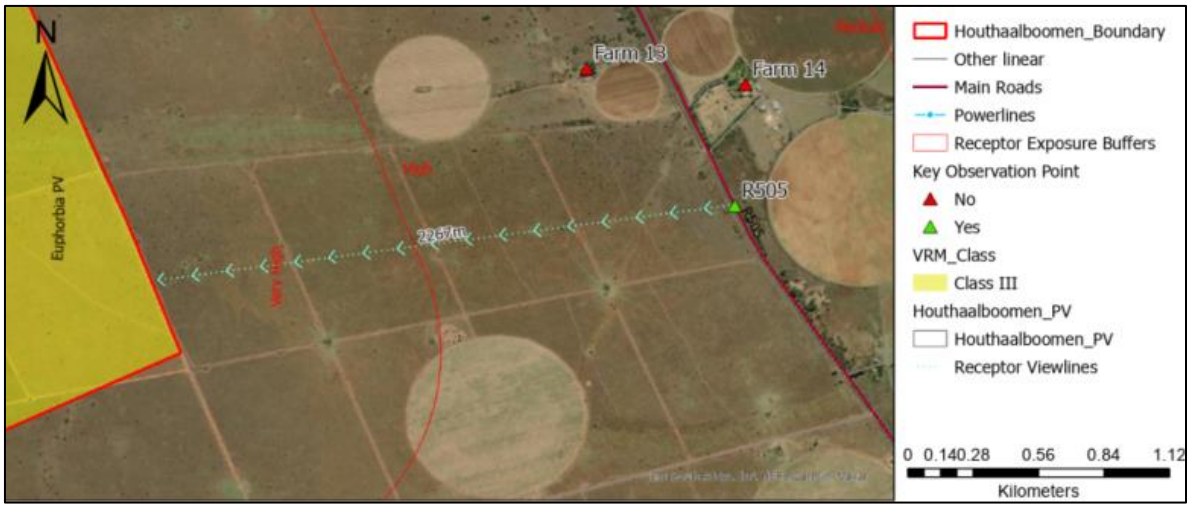


Figure 19. R505 Receptor Viewline Map.

Farmstead 9

Based on the cadastral and farm roads, it appears that Farm 9 is located within the property of the proponent. A review of the satellite imagery found that the main dwelling is located behind a cops of trees, limited views towards the north. The main views of the dwelling are to the south, away from the PV area.

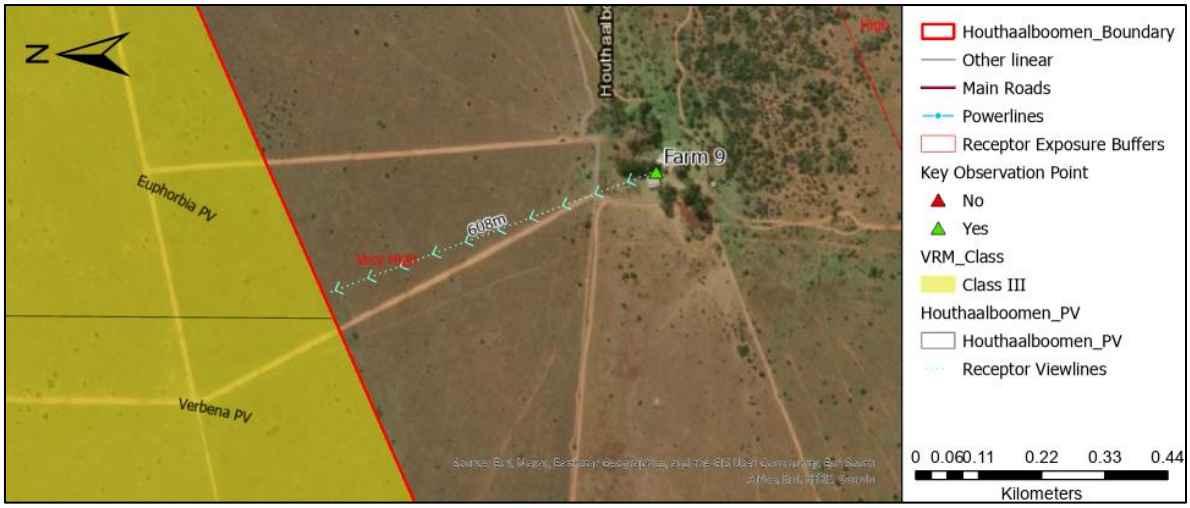


Figure 20. View line map from Receptor Farmstead 9.

Farmstead 10

As depicted in the receptor view line map below, the farmstead is located 538m to the north of the proposed Euphorbia PV area. The main dwelling is well screening from the proposed landscape change from shade trees located around the dwellings. The view from the main dwelling appears to be to the north, away from the PV landscape change. The local screening trees, main house view away from the PV area and the 500m distance would assist in reducing the intensity of the landscape change as seen from the dwelling. Intensity of the landscape change from the remainder of the farm (and other neighbouring farms) is likely to be strong. In order to main some degree of rural sense of place, a 50m buffer on the property boundary is recommended. Medium sized thornveld trees in this area should be retained, and encouraged to grow, and the area should be fenced off to allow for a continuation of the existing low intensity animal farming.

Figure 21. View line map from Receptor Farmstead 10.

8.2 PV Project Impact Ratings and Motivation

The following visual impacts could take place during the lifetime of the ***proposed*** PV Solar Facility project:

Construction:

- Loss of site landscape character due to the removal of vegetation and the construction of the PV structures and associated infrastructure.
- Wind-blown dust due to the removal of large areas of vegetation.
- Possible soil erosion from temporary roads crossing drainage lines.
- Wind-blown litter from the laydown and construction sites.

Operation:

- Massing effect in the landscape from a large-scale modification changing the local rural sense of place.
- On-going soil erosion.
- On-going windblown dust.

Decommissioning:

- Movement of large vehicles and associated dust.
- Wind-blown dust from the disturbance of cover vegetation / gravel.

Cumulative:

- A long-term change in land use setting a precedent for other similar types of solar energy projects.

Table 20: Construction Phase Impacts Table

Project phase	**Construction Phase**			
Impact	**Short-term landscape change from the current rural agricultural sense of place to the semi-industrial RE landscape.**			
Description of impact	• Loss of site landscape character due to the removal of vegetation and the construction of the PV structures and associated infrastructure. • Wind-blown dust due to the removal of large areas of vegetation and large earth moving equipment. • Possible soil erosion from temporary roads. • Wind-blown litter from the laydown and construction sites.			
Mitigation Viability	Medium	The mitigation will partially reduce the significance of the visual and landscape impacts		
Potential mitigation	• To reduce the intensity of cumulative views of multiple projects, a 50m agri-buffer on external property boundary is recommended. • Medium sized thornveld trees in this area should be retained, encouraged to grow, and planted to a density of approximately 2 trees per 100m square. • The area should be fenced off to allow for a continuation of the existing low intensity animal farming. The buffer can include roads, power lines and other infrastructure. • The area needs to be managed such that there is no risk from wildfire, and may require tractor-mowing to reduce veld grass growth.			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Negative	
Duration	Short term	Impact will last approximately 12 months.	Short term	Impact will last approximately 12 months.

Extent	Local	Contained within the Foreground/ Mid Ground (approx. 6km from site)	Local	Contained within the Foreground/ Mid Ground (approx. 6km from site)
Intensity	Medium to High	Natural and/ or social functions and/ or processes are clearly altered.	Medium to Low	Natural and/ or social functions and/ or processes are partially altered.
Probability	Likely	The impact is likely to occur	Likely	The impact is likely to occur.
Confidence	Sure	Substantive supportive data exists to verify the assessment	Sure	Substantive supportive data exists to verify the assessment
Reversibility	Medium	The affected landscape will be able to recover from the impact as there are minimal cut/fills and the thornveld vegetation will regrow over time to some degree.	Medium	The affected landscape will be able to recover from the impact as there are minimal cut/fills and the thornveld vegetation will regrow over time to some degree.
Significance	**Medium (-ve)**		**Medium to Low (-ve)**	
Comment on significance	Without mitigation, the High Exposure views from the adjacent farms would detract from the local rural landscape character.		Mitigation for dust and retaining/ encouraging of existing growth in the agri-buffers would assist in reducing the intensity of the PV landscape change.	
Cumulatives	**Low (-ve)**		**Low (-ve)**	
Cumulative impacts	The shorter time period of the construction, as well as the fact that no other PV developments are located within the ZVI, reduce the potential for cumulative effects.			

Table 21: Operation Phase Impacts Table

Project phase	**Operation Phase**			
Impact	**Short-term landscape change from the current rural agricultural sense of place to the semi-industrial RE landscape.**			
Description of impact	• Loss of site landscape character due to the operation of the PV structures and associated infrastructure.			
Mitigation Viability	Medium	The mitigation will partially reduce the significance of the visual and landscape impacts		
Potential mitigation	• Continued management of the agri-buffer to ensure that the area does not become fire risk.			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Negative	
Duration	Long term	Impact will last approximately 20 years	Long term	Impact will last approximately 20 years
Extent	Local	Contained within the Foreground/ Mid Ground (approx. 6km from site)	Local	Contained within the Foreground/ Mid Ground (approx. 6km from site)
Intensity	Medium	Natural and/ or social functions and/ or	Medium to Low	Natural and/ or social functions and/ or

		processes are clearly altered.		processes are partially altered.
Probability	Likely	The impact is likely to occur	Likely	The impact is likely to occur.
Confidence	Sure	Substantive supportive data exists to verify the assessment	Sure	Substantive supportive data exists to verify the assessment
Reversibility	Medium	The affected landscape will be able to recover from the impact as there are minimal cut/fills and the thornveld vegetation will regrow over time to some degree.	Medium	The affected landscape will be able to recover from the impact as there are minimal cut/fills and the thornveld vegetation will regrow over time to some degree.
Significance	**Medium (-ve)**		**Low (-ve)**	
Comment on significance	Without mitigation, the High Exposure views from the adjacent road would detract from the local landscape character degrading local landscape resources. The area is well set back from main roads and only two farmsteads would experience High Exposed levels.		With mitigation, and the creation of a agri-buffer along the northern and western boundaries will entrench the rural agricultural sense of place in the Medium-term.	
Cumulatives	**High (-ve)**		**Medium (-ve)**	
Comment Cumulative impacts	Without mitigation, there is a potential for a strong change to the rural agricultural landscape by the intervisibility of the three semi-industrial PV landscape, with potential to degrade the local rural landscape character.		With mitigation, a precedent would be set for suitable PV development in rural landscapes, reducing the intervisibility potential of the PV landscape change, and setting a positive precedent for other PV development in the region.	

Table 22: Decommissioning Phase Impacts Table

Project phase	**Decommissioning Phase**			
Impact	**Short-term landscape change from the removal of the PV structures, followed by rehabilitation of the impacted areas back to agricultural lands.**			
Description of impact	• Movement of large vehicles required for the removal of the PV panels, power lines, mono-poles and substations. • Wind-blown dust from impacts to vegetation. • Wind-blown litter from the laydown and construction sites.			
Mitigation Viability	Medium	The mitigation will reduce the significance of the visual and landscape impacts		
Potential mitigation	• Dust suppression measures. • Litter management measures. • Rehabilitation of impacted areas to agriculturally viable grasslands.			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Negative	
Duration	Short term	Impact will last approximately 8 months.	Short term	Impact will last approximately 8 months.

Extent	Local	Contained within the Foreground/ Mid Ground (approx. 6km from site)	Local	Contained within the Foreground/ Mid Ground (approx. 6km from site)
Intensity	Medium	Natural and/ or social functions and/ or processes are moderately altered.	Medium	Natural and/ or social functions and/ or processes are moderately altered.
Probability	Likely	The impact is likely to occur	Likely	The impact is likely to occur.
Confidence	Sure	Substantive supportive data exists to verify the assessment	Sure	Substantive supportive data exists to verify the assessment
Reversibility	Medium	The affected landscape will be able to recover from the impact as there are minimal cut/fills and the thornveld vegetation will regrow over time to some degree.	Medium	The affected landscape will be able to recover from the impact as there are minimal cut/fills and the thornveld vegetation will regrow over time to some degree.
Significance	**Medium (-ve)**		**Low (-ve)**	
Comment on significance	The dust and vehicle movement impacts are short-term in Duration, and outside the main views of the Renosterberg Safari accommodation.		Visual Intrusion from wind blown dust and from vehicle movement is limited and short-term in Duration.	
Cumulatives	**Medium (-ve)**		**Neutral**	
Cumulative impacts	Without rehabilitation, the return of the vegetation to the site and the associated visual impacts would last a longer time period. However, as this is likely to occur naturally, the cumulative risk is limited.		Effective management of rehabilitation can result in the return of the landscape to that of a functional agricultural area.	

9 PRELIMINARY ENVIRONMENTAL MANAGEMENT PLAN

9.1 PV Project

9.1.1 Design Phase

- To reduce the intensity of cumulative views of multiple projects, a 50m agri-buffer on external property boundary is recommended. Medium sized thornveld trees in this area should be retained, encouraged to grow, and planted to a density of approximately 2 trees per 100m square. The area should be fenced off to allow for a continuation of the existing low intensity animal farming. The buffer can include roads, power lines and other infrastructure. To ensure that the area does not become a wildfire risk, the veld grasses in the agri-buffer needs to be kept short by animal grazing or cut regularly by a tractor-mower (subject to fire risk management review).

9.1.2 Construction Phase

- The laydown and building structures should be located away from neighbouring property farmsteads.

- Following the removal of the vegetation, wind blown dust during construction should be monitored by the ECO to ensure that it does not become a nuisance factor to the local receptors. Should excessive dust be generated from the movement of vehicles on the roads such that the dust becomes visible to the immediate surrounds, dust-retardant measures should be implemented under authorisation of the ECO.
- Topsoil from the footprints of the road and structures should be dealt with in accordance with EMP.
- The buildings should be painted a grey-brown colour.
- Fencing should be simple, diamond shaped (to catch wind-blown litter) and appear transparent from a distance. The fences should be checked on a monthly basis for the collection of litter caught on the fence.
- Signage on the main access roads should be moderated.
- Lights at night have the potential to significantly increase the visual exposure of the proposed project. It is recommended that mitigations be implemented to reduce light spillage (refer to appendix for general guidelines). No overhead lighting to be used for security purposes.
- Limit the height of the PV panels to maximum of 5.5m above ground level.
- To assist in reducing the colour contrast from the BESS system, medium sized trees need to be planted around the area to provide visual screening in the medium-term. The structures also need to be placed away from the northern and western project boundaries to are exposed to neighbouring properties.
- All internal power line cables need to be buried so as to reduce visual intrusion to the local landscape.

9.1.3 Operation Phase

- Control of lights at night to allow only local disturbance to the current dark sky night landscape (refer to appendix for general guidelines).
- Continued erosion control and management of dust.
- The agri-buffer needs to be managed via cattle grazing to ensure that the buffer does not become a fire risk. Thinning of trees should take placed as necessary.

9.1.4 Decommissioning Phase

- All structures should be removed and where possible, recycled.
- Building structures should be broken down (including foundations).
- The rubble should be managed according to NEMWA and deposited at a registered landfill if it cannot be recycled or reused.
- All compacted areas should be rehabilitated according to a rehabilitation specialist.
- Monitoring for soil erosion should be undertaken on a routine biannual basis for one year following the completion of the Decommissioning Phase.

10 OPPORTUNITIES AND CONSTRAINTS

10.1 PV Project

10.1.1 Opportunities

- The ZVI is contained to the local area with Foreground/ Mid Ground distancing due to slightly undulating terrain that includes sparse thornveld vegetation. This would result in a moderate zone of visual influence.

- No tourist activities or tourist view-corridors were located within the project ZVI.
- National energy objectives for renewable energy and job creation will be met.

10.1.2 Constraints

- High Exposure views from adjacent farms with potential for change to the local landscape character without mitigation.
- The area is not within the REDZ area.

10.2 No-Go Option

10.2.1 Opportunities

- The current rural agricultural land uses of the property do add to the rural agricultural landscape character.
- Agricultural productivity from cattle farming creates some employment opportunities.

10.2.2 Constraints

- National energy objectives for renewable energy and job creation will not be met.

11 CONCLUSION

It is the recommendation that the proposed development should commence WITH MITIGATION for the following key reasons:

- Alignment with National planning related to energy and job creation.
- Moderated ZVI with no tourism activities or tourist view-corridors.
- Receptors sensitive to landscape change are limited but do include the adjacent farmers with High levels of Visual Exposure.

Mitigation required to ensure that the landscape change remains congruent with the rural agricultural landscape character:

- A 50m buffer on the property boundary is recommended. Medium sized thornveld trees in this area should be retained at low density to assist in reducing intervisibility without creating a wildfire risk, and the area should be fenced off to allow for a continuation of the existing low intensity animal farming.

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13 ANNEXURE A: FIELD SURVEY

ID	8
NAME	Grid connect
REMARKS	Existing power lines along the proposed corridor increasing the VAC levels and degrading local landscape character.
Context	Landscape Character
Direction	SE
REC_TIME	01/21/2022 15:24:47.542 SAST
LATITUDE	-26.1040925
LONGITUDE	26.11205142

ID	9
NAME	Grid Connect Receptor
REMARKS	Photograph of the farmstead located to the east of the proposed grid connect with no residential dwellings visible.
Context	Receptor
Direction	E
REC_TIME	01/21/2022 15:24:47.542 SAST
LATITUDE	-26.1040925
LONGITUDE	26.11205142

ID	10
NAME	R505
REMARKS	View west from the R505 with medium sized trees screening clear views of the proposed Euphorbia PV site.
Project	HHB
Context	Receptor
Direction	W
REC_TIME	01/21/2022 15:43:19.506 SAST
LATITUDE	-26.0644135
LONGITUDE	26.1145737

ID	12
NAME	Hillardia PV Site
REMARKS	View down the fenceline located on the southern boundary of Hillardia PV characterised by flat, grass covered terrain with scattered.small trees.
Project	HHB
Context	Landscape Character
Direction	NEE
REC_TIME	01/21/2022 16:17:48.774 SAST
LATITUDE	-26.07782573
LONGITUDE	26.06930405

ID	13
NAME	Verbena PV Site
REMARKS	View down the wooden 88kV power line with small trees re emphasising the aesthetic nature of the rural agricultural landscape.
Project	HHB
Context	Landscape Character
Direction	NE
REC_TIME	01/21/2022 16:27:29.329 SAST
LATITUDE	-26.07531536
LONGITUDE	26.07780799

ID	14
NAME	Farmstead 10
REMARKS	Views from the Euphoria PV site towards the farmstead located 500m to the north of the project.
Project	HHB
Context	Receptor
Direction	NW
REC_TIME	01/21/2022 16:28:52.867 SAST
LATITUDE	-26.05101148
LONGITUDE	26.08633239

ID	15
NAME	Euphoria PV Site
REMARKS	View of the flat terrain and fenced grassland paddocks offering limited visual appeal.
Project	HHB
Context	Landscape Character
Direction	N
REC_TIME	01/21/2022 16:33:37.895 SAST
LATITUDE	-26.07009239
LONGITUDE	26.08927779

ID	18
NAME	Lafarge Cement Plant
REMARKS	A zoomed view of the Lafarge Cement Plant visible in the background that reemphasises the built nature of areas around Lichtenberg Town.
Context	Landscape Character
Direction	E
REC_TIME	01/21/2022 17:30:59.856 SAST
LATITUDE	-26.1340509
LONGITUDE	26.18291974

14 ANNEXURE B: SPECIALIST INFORMATION

14.1 Professional Registration Certificate

APHP

Association of Professional Heritage Practitioners

MEMBERSHIP CERTIFICATE

THIS CERTIFIES THAT

STEPHEN STEAD
MEMBERSHIP NUMBER: 0063

has been accredited as a

PROFESSIONAL HERITAGE PRACTITIONER (PHP)

This membership is subject to the *Standards for Accreditation* and *Code of Conduct*, referred to in Sections 2 and 3 of the APHP Constitution respectively. The definition of a PHP may be found at: www.aphp.org.za/membership

Please contact us via info@aphp.org.za should further information be required.

THIS CERTIFICATE IS VALID FROM 1 JUNE 2020 – 1 JULY 2021

CHAIRPERSON

[Issued by the Association of Professional Heritage Practitioners Executive Committee]
Image Source: *Drawing of corbelled huts*, James Walton Collection, Stellenbosch University.
https://digital.lib.sun.ac.za/handle/10019.2/490

Association of Professional Heritage Practitioners
info@aphp.org.za
www.aphp.org.za

14.2 Curriculum Vitae (CV)

1. **Position**: Owner / Director

2. **Name of Firm**: Visual Resource Management Africa cc *(www.vrma.co.za)*

3. **Name of Staff**: Stephen Stead

4. **Date of Birth**: 9 June 1967

5. **Nationality:** South African

6. **Contact Details:** **Tel: +27 (0) 44 876 0020**
   Cell: +27 (0) 83 560 9911
   Email: steve@vrma.co.za

7. **Educational qualifications**:
   - University of Natal (Pietermaritzburg):
   - Bachelor of Arts: Psychology and Geography
   - Bachelor of Arts (Hons): Human Geography and Geographic Information Management Systems

8. **Professional Accreditation**
   - Association of Professional Heritage Practitioners (APHP) Western Cape
     - Accredited VIA practitioner member of the Association (2011)

9. **Association involvement:**
   - International Association of Impact Assessment (IAIA) South African Affiliate
     - Past President (2012 - 2013)
     - President (2012)
     - President-Elect (2011)
     - Conference Co-ordinator (2010)
     - National Executive Committee member (2009)
     - Southern Cape Chairperson (2008)

10. **Conferences Attended:**
    - IAIAsa 2012
    - IAIAsa 2011
    - IAIA International 2011 (Mexico)
    - IAIAsa 2010
    - IAIAsa 2009
    - IAIAsa 2007

11. **Continued Professional Development:**
    - Integrating Sustainability with Environment Assessment in South Africa (IAIAsa Conference, 1 day)
    - Achieving the full potential of SIA (Mexico, IAIA Conference, 2 days 2011)
    - Researching and Assessing Heritage Resources Course (University of Cape Town, 5 days, 2009)

12. Countries of Work Experience:

- South Africa, Mozambique, Malawi, Lesotho, Kenya and Namibia

13. Relevant Experience:

Stephen gained six years of experience in the field of Geographic Information Systems mapping and spatial analysis working as a consultant for the KwaZulu-Natal Department of Health and then with an Environmental Impact Assessment company based in the Western Cape. In 2004 he set up the company Visual Resource Management Africa that specializes in visual resource management and visual impact assessments in Africa. The company makes use of the well-documented Visual Resource Management methodology developed by the Bureau of Land Management (USA) for assessing the suitability of landscape modifications. Stephen has assessed of over 150 major landscape modifications throughout southern and eastern Africa. The business has been operating for eighteen years and has successfully established and retained a large client base throughout Southern Africa which include amongst others, Rio Tinto (Pty) Ltd, Bannerman (Pty) Ltd, Anglo Coal (Pty) Ltd, Eskom (Pty) Ltd, NamPower and Vale (Pty) Ltd, Ariva (Pty) Ltd, Harmony Gold (Pty) Ltd, Millennium Challenge Account (USA), Pretoria Portland Cement (Pty) Ltd

14. Languages:

- English – First Language
- Afrikaans – fair in speaking, reading and writing

15. Projects:

A list of ***some*** of the large-scale projects that VRMA has assessed has been attached below with the client list indicated per project (Refer to www.vrma.co.za for a full list of projects undertaken).

Table 23: VRM Africa Projects Assessments Table

YEAR	NAME	DESCRIPTION	LOCATION
2020	Dysanklip & Re Capital 3C BESS	Battery Storage	Northern Cape (SA)
2020	Hotazel PV 2	Solar Energy	Northern Cape (SA)
2020	Hotazel PV Amend	Solar Energy	Northern Cape (SA)
2020	Penhill Water Reservoir	Infrastructure	Western Cape (SA)
2020	Kenhardt BESS x 6	Battery Storage	Northern Cape (SA)
2020	Humansdorp BESS	Battery Storage	Northern Cape (SA)
2020	Bloemsmond PV BESS x 5	Battery Storage	Northern Cape (SA)
2020	Mulilo Prieska BESS x 5	Battery Storage	Northern Cape (SA)
2020	Mulilo De Arr BESS x 3	Battery Storage	Northern Cape (SA)
2020	Sandpiper Estate	Residential	Western Cape (SA)
2020	Obetsebi Lampley Interchange	Infrastructure	Ghana
2019	Port Barry Residential	Settlement	Western Cape (SA)
2019	Gamsberg Smelter	Plant	Northern Cape (SA)
2019	Sandpiper Nature Reserve Lodge	Residential	Western Cape (SA)
2019	Bloemsmond PV 4 - 5	Solar Energy	Northern Cape (SA)

2019	Mphepo Wind (Scoping Phase)	Wind Energy	Zambia
2018	Mogara PV	Solar Energy	Northern Cape (SA)
2018	Gaetsewe PV	Solar Energy	Northern Cape (SA)
2017	Kalungwishi Hydroelectric (2) and power line	Hydroelectric	Zambia
2017	Mossel Bay UISP (Kwanoqaba)	Settlement	Western Cape (SA)
2017	Pavua Dam and HEP	Hydroelectric	Mozambique (SA)
2017	Penhill UISP Settlement (Cape Town)	Settlement	Western Cape (SA)
2016	Kokerboom WEF * 3	Wind Energy	Northern Cape (SA)
2016	Hotazel PV	Solar Energy	Northern Cape (SA)
2016	Eskom Sekgame Bulkop Power Line	Infrastructure	Northern Cape (SA)
2016	Ngonye Hydroelectric	Hydroelectric	Zambia
2016	Levensdal Infill	Settlement	Western Cape (SA)
2016	Arandis CSP	Solar Energy	Namibia
2016	Bonnievale PV	Solar Energy	Western Cape (SA)
2015	Noblesfontein 2 & 3 WEF (Scoping)	Wind Energy	Eastern Cape (SA)
2015	Ephraim Sun SEF	Solar Energy	Northern Cape (SA)
2015	Dyasonsklip and Sirius Grid TX	Solar Energy	Northern Cape (SA)
2015	Dyasonsklip PV	Solar Energy	Northern Cape (SA)
2015	Zeerust PV and transmission line	Solar Energy	North West (SA)
2015	Bloemsmond SEF	Solar Energy	Northern Cape (SA)
2015	Juwi Copperton PV	Solar Energy	Northern Cape (SA)
2015	Humansrus Capital 14 PV	Solar Energy	Northern Cape (SA)
2015	Humansrus Capital 13 PV	Solar Energy	Northern Cape (SA)
2015	Spitzkop East WEF (Scoping)	Solar Energy	Western Cape (SA)
2015	Lofdal Rare Earth Mine and Infrastructure	Mining	Namibia
2015	AEP Kathu PV	Solar Energy	Northern Cape (SA)
2014	AEP Mogobe SEF	Solar Energy	Northern Cape (SA)
2014	Bonnievale SEF	Solar Energy	Western Cape (SA)
2014	AEP Legoko SEF	Solar Energy	Northern Cape (SA)
2014	Postmasburg PV	Solar Energy	Northern Cape (SA)
2014	Joram Solar	Solar Energy	Northern Cape (SA)
2014	RERE PV Postmasberg	Solar Energy	Northern Cape (SA)
2014	RERE CPV Upington	Solar Energy	Northern Cape (SA)
2014	Rio Tinto RUL Desalinisation Plant	Industrial	Namibia
2014	NamPower PV * 3	Solar Energy	Namibia
2014	Pemba Oil and Gas Port Expansion	Industrial	Mozambique
2014	Brightsource CSP Upington	Solar Energy	Northern Cape (SA)
2014	Witsand WEF (Scoping)	Wind Energy	Western Cape (SA)
2014	Kangnas WEF	Wind Energy	Western Cape (SA)
2013	Cape Winelands DM Regional Landfill	Industrial	Western Cape (SA)
2013	Drennan PV Solar Park	Solar Energy	Eastern Cape (SA)

2013	Eastern Cape Mari-culture	Mari-culture	Eastern Cape (SA)
2013	Eskom Phantom Pass Substation	Substation /Tx lines	Western Cape (SA)
2013	Frankfort Paper Mill	Plant	Free State (SA)
2013	Gibson Bay PV Facility Transmission lines	Transmission lines	Eastern Cape (SA)
2013	Houhoek Eskom Substation	Substation /Tx lines	Western Cape (SA)
2013	Mulilo PV Solar Energy Sites (x4)	Solar Energy	Northern Cape (SA)
2013	Namies Wind Farm	Wind Energy	Northern Cape (SA)
2013	Rossing Z20 Pit and WRD	Mining	Namibia
2013	SAPPI Boiler Upgrade	Plant	Mpumalanga (SA)
2013	Tumela WRD	Mine	North West (SA)
2013	Weskusfleur Substation (Koeburg)	Substation /Tx lines	Western Cape (SA)
2013	Yzermyn coal mine	Mining	Mpumalanga (SA)
2012	Afrisam	Mining	Western Cape (SA)
2012	Bitterfontein	Solar Energy	Northern Cape (SA)
2012	Kangnas PV	Solar Energy	Northern Cape (SA)
2012	Kangnas Wind	Solar Energy	Northern Cape (SA)
2012	Kathu CSP Tower	Solar Energy	Northern Cape (SA)
2012	Kobong Hydro	Hydro & Powerline	Lesotho
2012	Letseng Diamond Mine Upgrade	Mining	Lesotho
2012	Lunsklip Windfarm	Wind Energy	Western Cape (SA)
2012	Mozambique Gas Engine Power Plant	Plant	Mozambique
2012	Ncondezi Thermal Power Station	Substation /Tx lines	Mozambique
2012	Sasol CSP Tower	Solar Power	Free State (SA)
2012	Sasol Upington CSP Tower	Solar Power	Northern Cape (SA)
2011	Beaufort West PV Solar Power Station	Solar Energy	Western Cape (SA)
2011	Beaufort West Wind Farm	Wind Energy	Western Cape (SA)
2011	De Bakke Cell Phone Mast	Structure	Western Cape (SA)
2011	ERF 7288 PV	Solar Energy	Western Cape (SA)
2011	Gecko Industrial park	Industrial	Namibia
2011	Green View Estates	Residential	Western Cape (SA)
2011	Hoodia Solar	Solar Energy	Western Cape (SA)
2011	Kalahari Solar Power Project	Solar Energy	Northern Cape (SA)
2011	Khanyisa Power Station	Power Station	Western Cape (SA)
2011	Olvyn Kolk PV	Solar Energy	Northern Cape (SA)
2011	Otjikoto Gold Mine	Mining	Namibia
2011	PPC Rheebieck West Upgrade	Industrial	Western Cape (SA)
2011	George Southern Arterial	Road	Western Cape (SA)
2010	Bannerman Etango Uranium Mine	Mining	Namibia
2010	Bantamsklip Transmission	Transmission	Eastern Cape (SA)
2010	Beaufort West Urban Edge	Mapping	Western Cape (SA)
2010	Bon Accord Nickel Mine	Mining	Mapumalanga (SA)

2010	Etosha National Park Infrastructure	Housing	Namibia
2010	Herolds Bay N2 Development Baseline	Residential	Western Cape (SA)
2010	MET Housing Etosha	Residential	Namibia
2010	MET Housing Etosha Amended MCDM	Residential	Namibia
2010	MTN Lattice Hub Tower	Structure	Western Cape (SA)
2010	N2 Herolds Bay Residential	Residential	Western Cape (SA)
2010	Onifin(Pty) Ltd Hartenbos Quarry Extension	Mining	Western Cape (SA)
2010	Still Bay East	GIS Mapping	Western Cape (SA)
2010	Vale Moatize Coal Mine and Railway	Mining / Rail	Mozambique
2010	Vodacom Mast	Structure	Western Cape (SA)
2010	Wadrif Dam	Dam	Western Cape (SA)
2009	Asazani Zinyoka UISP Housing	Residential Infill	Western Cape (SA)
2009	Eden Telecommunication Tower	Structure	Western Cape (SA)
2009	George SDF Landscape Characterisation	GIS Mapping	Western Cape (SA)
2009	George SDF Visual Resource Management	GIS Mapping	Western Cape (SA)
2009	George Western Bypass	Road	Western Cape (SA)
2009	Knysna Affordable Housing Heidevallei	Residential Infill	Western Cape (SA)
2009	Knysna Affordable Housing Hornlee Project	Residential Infill	Western Cape (SA)
2009	Rossing Uranium Mine Phase 2	Mining	Namibia
2009	Sun Ray Wind Farm	Wind Energy	Western Cape (SA)
2008	Bantamsklip Transmission Lines Scoping	Transmission	Western Cape (SA)
2008	Erf 251 Damage Assessment	Residential	Western Cape (SA)
2008	Erongo Uranium Rush SEA	GIS Mapping	Namibia
2008	Evander South Gold Mine Preliminary VIA	Mining	Mpumalanga (SA)
2008	George SDF Open Spaces System	GIS Mapping	Western Cape (SA)
2008	Hartenbos River Park	Residential	Western Cape (SA)
2008	Kaaimans Project	Residential	Western Cape (SA)
2008	Lagoon Garden Estate	Residential	Western Cape (SA)
2008	Moquini Beach Hotel	Resort	Western Cape (SA)
2008	NamPower Coal fired Power Station	Power Station	Namibia
2008	Oasis Development	Residential	Western Cape (SA)
2008	RUL Sulphur Handling Facility Walvis Bay	Mining	Namibia
2008	Walvis Bay Power Station	Structure	Namibia
2007	Calitzdorp Retirement Village	Residential	Western Cape (SA)
2007	Calitzdorp Visualisation	Visualisation	Western Cape (SA)
2007	Camdeboo Estate	Residential	Western Cape (SA)
2007	Destiny Africa	Residential	Western Cape (SA)
2007	Droogfontein Farm 245	Residential	Western Cape (SA)
2007	Floating Liquified Natural Gas Facility	Structure tanker	Western Cape (SA)
2007	George SDF Municipality Densification	GIS Mapping	Western Cape (SA)
2007	Kloofsig Development	Residential	Western Cape (SA)

2007	OCGT Power Plant Extension	Structure Power Plant	Western Cape (SA)
2007	Oudtshoorn Municipality SDF	GIS Mapping	Western Cape (SA)
2007	Oudtshoorn Shopping Complex	Structure	Western Cape (SA)
2007	Pezula Infill (Noetzie)	Residential	Western Cape (SA)
2007	Pierpoint Nature Reserve	Residential	Western Cape (SA)
2007	Pinnacle Point Golf Estate	Golf/Residential	Western Cape (SA)
2007	Rheebok Development Erf 252 Appeal	Residential	Western Cape (SA)
2007	Rossing Uranium Mine Phase 1	Mining	Namibia
2007	Ryst Kuil/Riet Kuil Uranium Mine	Mining	Western Cape (SA)
2007	Sedgefield Water Works	Structure	Western Cape (SA)
2007	Sulphur Handling Station Walvis Bay Port	Industrial	Namibia
2007	Trekkopje Uranium Mine	Mining	Namibia
2007	Weldon Kaya	Residential	Western Cape (SA)
2006	Farm Dwarsweg 260	Residential	Western Cape (SA)
2006	Fynboskruin Extension	Residential	Western Cape (SA)
2006	Hanglip Golf and Residential Estate	Residential	Western Cape (SA)
2006	Hansmoeskraal	Slopes Analysis	Western Cape (SA)
2006	Hartenbos Landgoed Phase 2	Residential	Western Cape (SA)
2006	Hersham Security Village	Residential	Western Cape (SA)
2006	Ladywood Farm 437	Residential	Western Cape (SA)
2006	Le Grand Golf and Residential Estate	Residential	Western Cape (SA)
2006	Paradise Coast	Residential	Western Cape (SA)
2006	Paradyskloof Residential Estate	Residential	Western Cape (SA)
2006	Riverhill Residential Estate	Residential	Western Cape (SA)
2006	Wolwe Eiland Access Route	Road	Western Cape (SA)
2005	Harmony Gold Mine	Mining	Mpumalanga (SA)
2005	Knysna River Reserve	Residential	Western Cape (SA)
2005	Lagoon Bay Lifestyle Estate	Residential	Western Cape (SA)
2005	Outeniquabosch Safari Park	Residential	Western Cape (SA)
2005	Proposed Hotel Farm Gansevallei	Resort	Western Cape (SA)
2005	Uitzicht Development	Residential	Western Cape (SA)
2005	West Dunes	Residential	Western Cape (SA)
2005	Wilderness Erf 2278	Residential	Western Cape (SA)
2005	Wolwe Eiland Eco & Nature Estate	Residential	Western Cape (SA)
2005	Zebra Clay Mine	Mining	Western Cape (SA)
2004	Gansevallei Hotel	Residential	Western Cape (SA)
2004	Lakes Eco and Golf Estate	Residential	Western Cape (SA)
2004	Trekkopje Desalination Plant	Structure Plant	Namibia (SA)
1995	Greater Durban Informal Housing Analysis	Photogrammetry	KwaZulu-Natal (SA)

15 ANNEXURE C: METHODOLOGY DETAIL

15.1 Baseline Analysis Stage

In terms of VRM methodology, landscape character is derived from a combination of ***scenic quality***, ***receptor sensitivity*** to landscape change and ***distance*** from the proposed landscape change. The objective of the analysis is to compile a mapped inventory of the visual resources found in the receiving landscape, and to derive a mapped Visual Resource sensitivity layer from which to evaluate the suitability of the landscape change.

15.1.1 Scenic Quality

The scenic quality is determined making use of the VRM Scenic Quality Checklist (refer to Table 24). The checklist identifies seven scenic quality criteria which are rated with 1 (low) to 5 (high) scale. The scores are totalled and assigned an A (High), B (Moderate) or C (low) based on the following split:

A= scenic quality rating of ≥19;
B = rating of 12 – 18,
C= rating of ≤11

The seven scenic quality criteria are defined below:

- **Land Form**: Topography becomes more of a factor as it becomes steeper, or more severely sculptured.
- **Vegetation**: Primary consideration given to the variety of patterns, forms, and textures created by plant life.
- **Water**: That ingredient which adds movement or serenity to a scene. The degree to which water dominates the scene is the primary consideration.
- **Colour**: The overall colour(s) of the basic components of the landscape (e.g., soil, rock, vegetation, etc.) are considered as they appear during seasons or periods of high use.
- **Scarcity**: This factor provides an opportunity to give added importance to one, or all, of the scenic features that appear to be relatively unique or rare within one physiographic region.
- **Adjacent Land Use**: Degree to which scenery and distance enhance, or start to influence, the overall impression of the scenery within the rating unit.
- **Cultural Modifications**: Cultural modifications should be considered and may detract from the scenery or complement or improve the scenic quality of an area.

15.1.2 Receptor Sensitivity

Receptor Sensitivity levels are a measure of public concern for scenic quality and assessed making use of the Sensitivity Checklist in **Error! Reference source not found.** . Receptor s ensitivity to landscape change is determined by rating the following factors in terms of Low to High:

- **Type of Users**: Visual sensitivity will vary with the type of users, e.g. recreational sightseers may be highly sensitive to any changes in visual quality, whereas workers who pass through the area on a regular basis may not be as sensitive to change.
- **Amount of Use**: Areas seen or used by large numbers of people are potentially more sensitive.

- **Public Interest**: The visual quality of an area may be of concern to local, or regional, groups. Indicators of this concern are usually expressed via public controversy created in response to proposed activities.
- **Adjacent Land Uses**: The interrelationship with land uses in adjacent lands. For example, an area within the viewshed of a residential area may be very sensitive, whereas an area surrounded by commercially developed lands may not be as visually sensitive.
- **Special Areas**: Management objectives for special areas such as Natural Areas, Wilderness Areas or Wilderness Study Areas, Wild and Scenic Rivers, Scenic Areas, Scenic Roads or Trails, and Critical Biodiversity Areas frequently require special consideration for the protection of their visual values.
- **Other Factors**: Consider any other information such as research or studies that include indicators of visual sensitivity.

15.1.3 Exposure

The area where a landscape modification starts to influence the landscape character is termed the Zone of Visual Influence (ZVI) and is defined by the U.K. Institute of Environmental Management and Assessment's (IEMA) *'Guidelines for Landscape and Visual Impact Assessment'* as 'the area within which a proposed development may have an influence or effect on visual amenity (of the surrounding areas).'

The inverse relationship of distance and visual impact is well recognised in visual analysis literature *(Hull, R.B. and Bishop, I.E., 1988)*. According to Hull and Bishop, exposure, or visual impact, tends to diminish exponentially with distance. The areas where most landscape modifications would be visible are located within 2 km from the site of the landscape modification. Thus, the potential visual impact of an object diminishes at an exponential rate as the distance between the observer and the object increases due to atmospheric conditions prevalent at a location, which causes the air to appear greyer, thereby diminishing detail. For example, viewed from 1000 m from a landscape modification, the impact would be 25% of the impact as viewed from 500 m from a landscape modification. At 2000m it would be 10% of the impact at 500 m.

Distance from a landscape modification influences the size and clarity of the landscape modification viewing. The Bureau of Land Management defines three distance categories:

i. ***Foreground / Middle ground***, up to approximately 6km, which is where there is potential for the sense of place to change.
ii. ***Background areas***, from 6km to 24km, where there is some potential for change in the sense of place, but where change would only occur in the case of very large landscape modifications; and
iii. ***Seldom seen areas***, which fall within the Foreground / Middle ground area but, because of no receptors, are not viewed or are seldom viewed.

15.1.4 Key Observation Points

During the Baseline Inventory Stage, Key Observation Points (KOPs) are identified. KOPs are defined by the Bureau of Land Management as the people (receptors) located in strategic locations surrounding the property that make consistent use of the views associated with the site where the landscape modifications are proposed. These locations are important in terms of the VRM methodology, which requires that the Degree of Contrast (DoC) that the proposed landscape modifications will make to the existing landscape be measured from these most

critical locations, or receptors, surrounding the property. To define the KOPs, potential receptor locations were identified in the viewshed analysis, and screened, based on the following criteria:

- Angle of observation.
- Number of viewers.
- Length of time the project is in view.
- Relative project size.
- Season of use.
- Critical viewpoints, e.g., views from communities, road crossings; and
- Distance from property.

15.2 Assessment and Impact Stage

The analysis stage involves determining whether the potential visual impacts from proposed surface-disturbing activities or developments will meet the management objectives established for the area, or whether design adjustments will be required. This requires a contrast rating to assess the expected DoC the proposed landscape modifications would generate within the receiving landscape in order to define the Magnitude of the impact.

15.2.1 Contrast Rating

The contrast rating is undertaken to determine if the VRM Class Objectives are met. The suitability of landscape modification is assessed by comparing and contrasting existing receiving landscape to the expected contrast that the proposed landscape change will generate. This is done by evaluating the level of change to the existing landscape by assessing the line, colour, texture and form, in relation to the visual objectives defined for the area. The following criteria are utilised in defining the DoC:

- **None**: The element contrast is not visible or perceived.
- **Weak**: The element contrast can be seen but does not attract attention.
- **Moderate**: The element contrast begins to attract attention and begins to dominate the characteristic landscape.
- **Strong**: The element contrast demands attention, will not be overlooked, and is dominant in the landscape.

As an example, in a Class I area, the visual objective is to preserve the existing character of the landscape, and the resultant contrast to the existing landscape should not be notable to the casual observer and cannot attract attention. In a Class IV area example, the objective is to provide for proposed landscape activities that allow for major modifications of the existing character of the landscape. Based on whether the VRM objectives are met, mitigations, if required, are defined to avoid, reduce, or mitigate the proposed landscape modifications so that the visual impact does not detract from the surrounding landscape sense of place.

Based on the findings of the contrast rating, the Magnitude of the Landscape and Visual Impact Assessment is determined.

15.2.2 Photomontages

As a component in this contrast rating process, visual representation, such as photo montages are vital in large-scale modifications, as this serves to inform Interested & Affected Parties and decision-making authorities of the nature and extent of the impact associated with the proposed project/development. There is an ethical obligation in this process, as visualisation can be misleading if not undertaken ethically. In terms of adhering to standards for ethical representation of landscape modifications, VRMA subscribes to the Proposed Interim Code of Ethics for Landscape Visualisation developed by the Collaborative for Advanced Landscape Planning (CALP) (Sheppard, 2000). This code states that professional presenters of realistic landscape visualisations are responsible for promoting full understanding of proposed landscape changes, providing an honest and neutral visual representation of the expected landscape, by seeking to avoid bias in responses and demonstrating the legitimacy of the visualisation process. Presenters of landscape visualisations should adhere to the principles of:

- Access to Information
- Accuracy
- Legitimacy
- Representativeness
- Visual Clarity and Interest

The Code of Ethical Conduct states that the presenter should:

- Demonstrate an appropriate level of qualification and experience.
- Use visualisation tools and media that are appropriate to the purpose.
- Choose the appropriate level of realism.
- Identify, collect and document supporting visual data available for, or used in, the visualisation process.
- Conduct an on-site visual analysis to determine important issues and views.
- Seek community input on viewpoints and landscape issues to address in the visualisations.
- Provide the viewer with a reasonable choice of viewpoints, view directions, view angles, viewing conditions and timeframes appropriate to the area being visualised.
- Estimate and disclose the expected degree of uncertainty, indicating areas and possible visual consequences of the uncertainties.
- Use more than one appropriate presentation mode and means of access for the affected public.
- Present important non-visual information at the same time as the visual presentation, using a neutral delivery.
- Avoid the use, or the appearance of, ‘sales’ techniques or special effects.
- Avoid seeking a particular response from the audience.
- Provide information describing how the visualisation process was conducted and how key decisions were taken (Sheppard, 2000).

15.3 VRM Checklists and Terminology

Table 24: Scenic Quality Checklist

KEY FACTORS	**RATING CRITERIA AND SCORE**		
SCORE	**5**	**3**	**1**

Land Form	High vertical relief as expressed in prominent cliffs, spires or massive rock outcrops, or severe surface variation or highly eroded formations or detail features that are dominating and exceptionally striking and intriguing.	Steep-sided river valleys, or interesting erosion patterns or variety in size and shape of landforms; or detail features that are interesting, though not dominant or exceptional.	Low rolling hills, foothills or flat valley bottoms; few or no interesting landscape features.
Vegetation	A variety of vegetative types as expressed in interesting forms, textures and patterns.	Some variety of vegetation, but only one or two major types.	Little or no variety or contrast in vegetation.
Water	Clear and clean appearing, still or cascading white water, any of which are a dominant factor in the landscape.	Flowing, or still, but not dominant in the landscape.	Absent, or present but not noticeable.
Colour	Rich colour combinations, variety or vivid colour: or pleasing contrasts in the soil, rock, vegetation, water.	Some intensity or variety in colours and contrast of the soil, rock and vegetation, but not a dominant scenic element.	Subtle colour variations contrast or interest: generally mute tones.
Adjacent Scenery	Adjacent scenery greatly enhances visual quality.	Adjacent scenery moderately enhances overall visual quality.	Adjacent scenery has little or no influence on overall visual quality.
Scarcity	One of a kind: unusually memorable, or very rare within region. Consistent chance for exceptional wildlife or wildflower viewing etc.	Distinctive, though somewhat similar to others within the region.	Interesting within its setting, but fairly common within the region.
SCORE	**2**	**0**	**-4**
Cultural Modification	Modifications add favourably to visual variety, while promoting visual harmony.	Modifications add little or no visual variety to the area and introduce no discordant elements.	Modifications add variety but are very discordant and promote strong disharmony.

Table 25: Sensitivity Level Rating Checklist

FACTORS	**QUESTIONS**	
Type of Users	**Maintenance of visual quality is:**	
	A major concern for most users	High
	A moderate concern for most users	Moderate
	A low concern for most users	Low
Amount of use	**Maintenance of visual quality becomes more important as the level of use increases:**	
	A high level of use	High
	Moderately level of use	Moderate
	Low level of use	Low
Public interest	**Maintenance of visual quality:**	

	A major concern for most users	High
	A moderate concern for most users	Moderate
	A low concern for most users	Low
Adjacent land Users	**Maintenance of visual quality to sustain adjacent land use objectives is:**	
	Very important	High
	Moderately important	Moderate
	Slightly important	Low
Special Areas	**Maintenance of visual quality to sustain Special Area management objectives is:**	
	Very important	High
	Moderately important	Moderate
	Slightly important	Low

Table 26: VRM Terminology Table

FORM	LINE	COLOUR	TEXTURE
Simple	Horizontal		Smooth
Weak	Vertical		Rough
Strong	Geometric		Fine
Dominant	Angular		Coarse
Flat	Acute		Patchy
Rolling	Parallel		Even
Undulating	Curved	Dark	Uneven
Complex	Wavy	Light	Complex
Plateau	Strong	Mottled	Simple
Ridge	Weak		Stark
Valley	Crisp		Clustered
Plain	Feathered		Diffuse
Steep	Indistinct		Dense
Shallow	Clean		Scattered
Organic	Prominent		Sporadic
Structured	Solid		Consistent

Simple	Basic, composed of few elements	**Organic**	Derived from nature; occurring or developing gradually and naturally
Complex	Complicated; made up of many interrelated parts	**Structure**	Organised; planned and controlled; with definite shape, form, or pattern
Weak	Lacking strength of character	**Regular**	Repeatedly occurring in an ordered fashion
Strong	Bold, definite, having prominence	**Horizontal**	Parallel to the horizon
Dominant	Controlling, influencing the surrounding environment	**Vertical**	Perpendicular to the horizon; upright
Flat	Level and horizontal without any slope; even and smooth without any bumps or hollows	**Geometric**	Consisting of straight lines and simple shapes

Rolling	Progressive and consistent in form, usually rounded	**Angular**	Sharply defined; used to describe an object identified by angles
Undulating	Moving sinuously like waves; wavy in appearance	**Acute**	Less than 90°; used to describe a sharp angle
Plateau	Uniformly elevated flat to gently undulating land bounded on one or more sides by steep slopes	**Parallel**	Relating to or being lines, planes, or curved surfaces that are always the same distance apart and therefore never meet
Ridge	A narrow landform typical of a highpoint or apex; a long narrow hilltop or range of hills	**Curved**	Rounded or bending in shape
Valley	Low-lying area; a long low area of land, often with a river or stream running through it, that is surrounded by higher ground	**Wavy**	Repeatedly curving forming a series of smooth curves that go in one direction and then another
Plain	A flat expanse of land; fairly flat dry land, usually with few trees	**Feathered**	Layered; consisting of many fine parallel strands
Steep	Sloping sharply often to the extent of being almost vertical	**Indistinct**	Vague; lacking clarity or form
Prominent	Noticeable; distinguished, eminent, or well-known	**Patchy**	Irregular and inconsistent;
Solid	Unadulterated or unmixed; made of the same material throughout; uninterrupted	**Even**	Consistent and equal; lacking slope, roughness, and irregularity
Broken	Lacking continuity; having an uneven surface	**Uneven**	Inconsistent and unequal in measurement irregular
Smooth	Consistent in line and form; even textured	**Stark**	Bare and plain; lacking ornament or relieving features
Rough	Bumpy; knobbly; or uneven, coarse in texture	**Clustered**	Densely grouped
Fine	Intricate and refined in nature	**Diffuse**	Spread through; scattered over an area
Coarse	Harsh or rough to the touch; lacking detail	**Diffuse**	To make something less bright or intense

16 ANNEXURE D: GENERAL LIGHTS AT NIGHT MITIGATIONS

Mitigation:

- Effective light management needs to be incorporated into the design of the lighting to ensure that the visual influence is limited to the proposed project, without jeopardising operational safety and security (See lighting mitigations by The New England Light Pollution Advisory Group (NELPAG) and Sky Publishing Corp in 14.2).
- Utilisation of specific frequency LED lighting with a green hue on perimeter security fencing.
- Directional lighting on the more exposed areas of operation, where point light source is an issue.
- No use of overhead lighting and, if possible, locate the light source closer to the operation.
- If possible, the existing overhead lighting method utilised at the mine should be phased out and replaced with an alternative lighting using closer to source, directed LED technology.

Mesopic Lighting

Mesopic vision is a combination of photopic vision and scotopic vision in low, but not quite dark, lighting situations. The traditional method of measuring light assumes photopic vision and is often a poor predictor of how a person sees at night. The light spectrum optimized for mesopic vision contains a relatively high amount of bluish light and is therefore effective for peripheral visual tasks at mesopic light levels. *(CIE, 2012)*

The Mesopic Street Lighting Demonstration and Evaluation Report by the Lighting Research Centre (LRC) in New York found that the 'replacement of white light sources (induction and ceramic metal halide) were tuned to optimize human vision under low light levels while remaining in the white light spectrum. Therefore, outdoor electric light sources that are tuned to how humans see under mesopic lighting conditions can be used to reduce the luminance of the road surface while providing the same, or better, visibility. Light sources with shorter wavelengths, which produce a "cooler" light (more blue and green), are needed to produce better mesopic vision. Based on this understanding, the LRC developed a means of predicting visual performance under low light conditions. This system is called the unified photometry system. Responses to surveys conducted on new installations revealed that area residents perceived higher levels of visibility, safety, security, brightness, and colour rendering with the new lighting systems than with the standard *High-Purity Standards* (HPS) systems. The new lighting systems used 30% to 50% less energy than the HPS systems. These positive results were achieved through tuning the light source to optimize mesopic vision. Using less wattage and photopic luminance also reduces the reflectance of the light off the road surface. Light reflectance is a major contributor to light pollution (sky glow).' *(Lighting Research Center. New York. 2008)*

'Good Neighbour – Outdoor Lighting'

Presented by the New England Light Pollution Advisory Group (NELPAG) *(http://cfa/ www.harvard .edu /cfa/ps/nelpag.html)* and Sky & Telescope *(http://SkyandTelescope.com/).* NELPAG and Sky & Telescope support the International Dark-Sky Association (IDA) *(http://www.darksky.org/).* (NELPAG)

What is good lighting? Good outdoor lights improve visibility, safety, and a sense of security, while minimizing energy use, operating costs, and ugly, dazzling glare.

Why should we be concerned? Many outdoor lights are poorly designed or improperly aimed. Such lights are costly, wasteful, and distractingly glary. They harm the night-time environment and neighbours' property values. Light directed uselessly above the horizon creates murky skyglow — the "light pollution" that washes out our view of the stars.

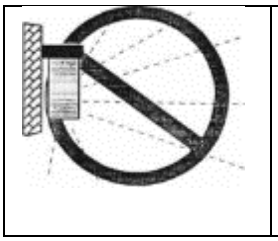
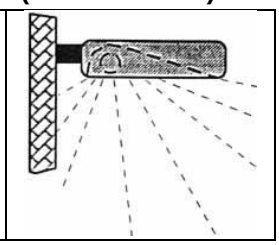
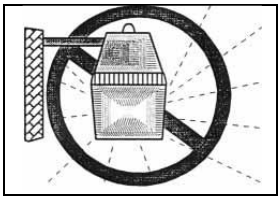
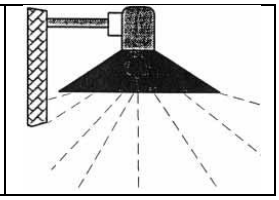
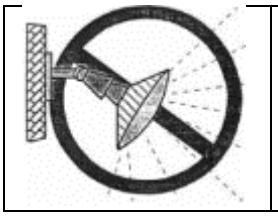
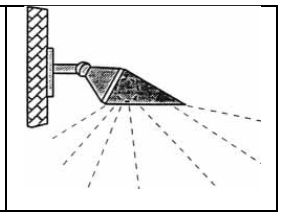
Glare Here's the basic rule of thumb: If you can see the bright bulb from a distance, it's a bad light. With a good light, you see lit ground instead of the dazzling bulb. "Glare" is light that beams directly from a bulb into your eye. It hampers the vision of pedestrians, cyclists, and drivers.

Light Trespass Poor outdoor lighting shines onto neighbours' properties and into bedroom windows, reducing privacy, hindering sleep, and giving the area an unattractive, trashy look.

Energy Waste Many outdoor lights waste energy by spilling much of their light where it is not needed, such as up into the sky. This waste results in high operating costs. Each year we waste more than a billion dollars in the United States needlessly lighting the night sky.

Excess Lighting Some homes and businesses are flooded with much stronger light than is necessary for safety or security.

Good and Bad Light Fixtures

Typical "Wall Pack"	**Typical "Shoe Box" (forward throw)**
	
BAD Waste light goes up and sideways	**GOOD** Directs all light down
Typical "Yard Light"	**Opaque Reflector (lamp inside)**
	
BAD Waste light goes up and sideways	**GOOD** Directs all light down
Area Flood Light	**Area Flood Light with Hood**
	
BAD Waste light goes up and sideways	**GOOD** Directs all light down

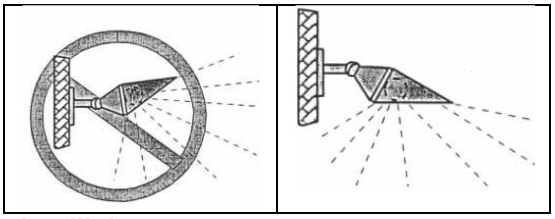
How do I switch to good lighting?

Provide only enough light for the task at hand; don't over-light, and don't spill light off your property. Specifying enough light for a job is sometimes hard to do on paper. Remember that a full Moon can make an area quite bright. Some lighting systems illuminate areas 100 times more brightly than the full Moon! More importantly, by choosing properly shielded lights, you can meet your needs without bothering neighbours or polluting the sky.

- Aim lights down. Choose “full-cutoff shielded” fixtures that keep light from going uselessly up or sideways. Full-cutoff fixtures produce minimum glare. They create a pleasant-looking environment. They increase safety because you see illuminated people, cars, and terrain, not dazzling bulbs.
- Install fixtures carefully to maximize their effectiveness on the targeted area and minimize their impact elsewhere. Proper aiming of fixtures is crucial. Most are aimed too high. Try to install them at night, when you can see where all the rays actually go. Properly aimed and shielded lights may cost more initially, but they save you far more in the long run. They can illuminate your target with a low-wattage bulb just as well as a wasteful light does with a high-wattage bulb.
- If colour discrimination is not important, choose energy- efficient fixtures utilising yellowish high-pressure sodium (HPS) bulbs. If “white” light is needed, fixtures using compact fluorescent or metal-halide (MH) bulbs are more energy-efficient than those using incandescent, halogen, or mercury-vapour bulbs.
- Where feasible, put lights on timers to turn them off each night after they are no longer needed. Put home security lights on a motion-detector switch, which turns them on only when someone enters the area; this provides a great deterrent effect!

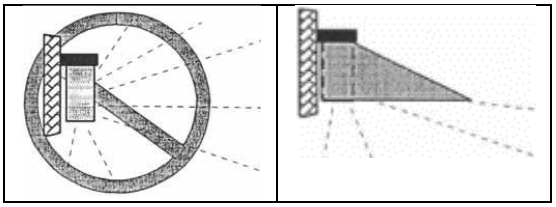
What You Can Do To Modify Existing Fixtures

Change this . . . to this (aim downward)



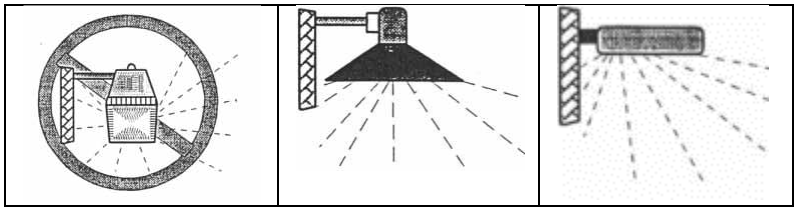
Floodlight:

Change this . . . to this (aim downward)



Wall Pack

Change this . . . to this or this



Yard Light | Opaque Reflecter | Show Box

Replace bad lights with good lights.

You’ll save energy and money. You’ll be a good neighbour. And you’ll help preserve our view of the stars.